

ROYAL ENGINEERS DIVING
ESTABLISHMENT

(ESTABLE CIMIENTO DE BUCEO
DE LOS INGENIEROS REALES)

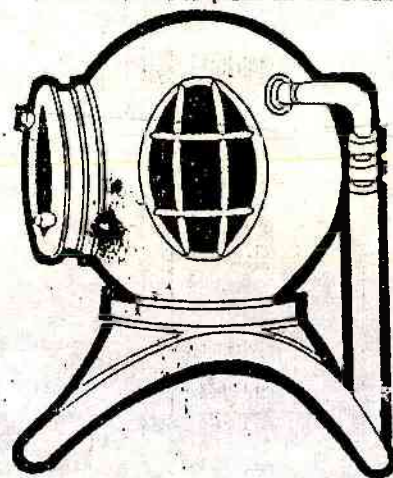
INSTRUCTIVOS. VARIOS

FONDO: CEM
SECCIÓN INTELIGENCIA.
CAJA : 33
CARPETA : 2.

(85)

⊗ AI (D)

ARMY DIVING SUPERVISOR AND UNIT DIVING SUPERVISOR COURSE PROGRAMME



ROYAL ENGINEERS DIVING ESTABLISHMENT

ROYAL ENGINEERS DIVING ESTABLISHMENT
DISCIPLINE AND DRESS

1. The staff of the RE Diving Establishment is very small numerically and the majority of them are employed full time running courses. Morning Parades and Inspections therefore are not held, and reliance and trust is placed on the individual student to maintain a high standard of dress and discipline throughout this course. This trust is not to be abused.

2. The fact that soldiers are detached from their own units for a short period does not mean that they can wear any form of dress they desire or that haircuts are no longer necessary. On the contrary, living within a barracks belonging to another Arm or Service should induce a pride in oneself and ones own unit and corps, for students to be better turned-out than they normally are.

3. Any student in obvious need of a haircut or who is found in an untidy state may have action taken to correct this state.

4. Works Dress for all ranks is:

a. Winter

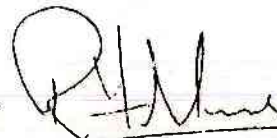
Clean, brushed beret
Shirt KF
Jersey wool heavy
Trousers/Lightweight
Boots Cbt, polished
Cbt Jacket as reqd

b. Summer

Clean, brushed beret
Shirt KF, sleeves correctly turned back
Trousers/Lightweight
Regimental/Corps Stable belt or belts waist nylon
Boots Cbt, polished

Frocks woollen white (ie jerseys white) and undersuits blue are NOT to be worn out of diving dress under any circumstances.

Students will be required to pay for stores losses which can be attributed to a particular individual and collectively or all other stores lost by the course which can be attributed to negligence.



R F MUNDY

Lieutenant Colonel RE
Commanding Officer
RE Diving Establishment

ROYAL ENGINEERS DIVING ESTABLISHMENT

CO - Lt Col R F Mundy RE
AI(D) - Capt I Ormesher RE
ID(A) - Capt H P Morgan RE
SMI - WOI L M Rutherford RE

SENIOR DIVING INSTRUCTOR

SSgt P Laidler RE (S1)

JUNIOR DIVING INSTRUCTOR

Cpl Mortlock (J1)

COURSE SUPPORT NCO

LCpl Abbott (CS)

ADDITIONAL INSTRUCTORS

WO2 Wallace APTI (S2)
Mr Miller (CIO)
Sgt Youle (S3)
Cpl Lane (J2)

ADMINISTRATIVE STAFF

RQMS - WO2 Johnson RE
CC - Sgt Pilkington RE
Fitter- Sgt Youle RE
MT NCO- Cpl Boggi

LEGEND

Admin	- Administration
BS	- Boat Store
CC	- Compression Chamber
C	- Cinema
CR	- Class Room
CT	- Clear Tank/EDU Trials Tank
CK	- Creek
Cage	- Course Cage
CTR	- Creek Training Room
CSB	- Combat Support Boat
D	- Diving
Exam	- Examination
Ex	- Exercise
FWTA	- Fast Water Training Area
Gym	- Gymnasium
HI	- Horsea Island
HW	- High Water
JTA	- Jetty Training Area 1 or 2
LT	- Lesson Theory
LP	- Lesson Practical
LW	- Low Water
P	- Practical
PT	- Physical Training
R	- Revision
SB	- Sick Bay
Stores	- RQMS Department (Vesuvius Building)
WT	- Work Tank

External training areas will be shown by name,

eg. Horsea
Plymouth
Portland
Wyke Regis
etc

ARMY DIVING SUPERVISOR COURSE NO 8
FROM: 29 JUN TO: 17 JUL 87

WEEK ONE

Fecha Hora Con leuicio Temas Lugar Instr Tipo Vest Observa.

DATE	TIME	SUBJECT CONTENT	PLACE	INSTR	TYPE	DRESS	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
MON 29 Jun	0810-0830	Arrival and documentation	CR	CC	Admin	Works	Issue Regulations HW
	0830-1000	Entrance Exam	CR	S1	Exam	Works	
	1000-1015	Stand easy					
	1015-1045	Draw personal kit	G1198	RQMS	Admin	Works	
		Cage handover	Cage	CS	Admin	Works	
	1045-1150	Diving equipment (R)	JTA	J1	L/P	Works	
	1150-1300	Lunch	Galley				
	1300-1400	Diving equipment (R)	JTA	J1	L/P	Works	
	1400-1430	Exam results and opening address	CR	SOD(A), AI(D), SMI, S1, J1	Admin	Works	
	1430-1445	Stand easy					
	1445-1530	Diving orders	CR	AI(D)	L	Works	
	1530-1630	Preparation & Planning of Diving Tasks	CR	SMI	L	Works	
TUE 30 Jun	0810-1150	Setting up a diving task. Task execution Accident procedure	JTA	J1	L/P	Works	SDI on site.
	1150-1300	Lunch	Galley				Issue tasks for Wed.
	1300-1345	Decompression - Methods & Rules (R)	CR	S1	L	Works	
	1345-1430	Decompression - Tables & Dive Logs (R)	CR	S1	L	Works	
	1430-1445	Stand easy					
	1445-1630	Therapeutic Recompression	CR	AI(D)	L	Works	CC. Patient. Pot Op. Drive Recorded. Duty.

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
WED 1 Jul	0810-0855 0900-0945 0945-1015 1015-1150 1150-1300 1300-1430 1430-1600 1600-1630 1630-1645	Reporting of diving incidents Charts and Tides (R) Stand easy Brief and execute tasks Lunch Brief and execute tasks Brief and execute tasks Load for Horsea Debrief	CR CR JTA JTA JTA Cage CR	SMI SMI S1, J1 S1, J1 S1, J1 CS S1, J1	L L D D D Admin Admin	Works Works Diving Diving Diving Works Works	Tpt: 1 x 4 ton Issue tasks for Thu.
THU 2 Jul	0800-0830 0830-1530 1530-1600 1600-1630 1630-1645	Move to Horsea Task assessments Return to Vernon Clean and maintain Debrief	HI Cage CR	All S1, J1 CS S1, J1	Admin D Admin Admin	Works Diving Works Works	Tpt: 1 x 4 ton) 0800 Nelson 1 x minibus) Haversack rations reqd. Issue tasks for Fri.
FRI 3 Jul	0810-1150 1150-1300 1300-1500 1500-1545 1545-1630	Task assessments Lunch Load for Portland Fast water search schemes (R) Debrief & brief for Portland	JTA Galley Cage CR CR	S1, J1 CS J1 S1, J1	D Admin L Admin	Diving Works Works Works	Tpt: 1 x 4 ton - 1300 cage + Tlr

WEEK TWO - PORTLAND

DATE	TIME	SUBJECT CONTENT	PLACE	INSTR	TYPE	DRESS	REMARKS
MON 6 Jul	0730-1000	Move to Portland	Wyke Regis	All	Admin	Works	Tpt: 1 x 4 ton + tlr 1 x minibus CSB reqd 1100 to move to Portland.
	1000-1100	Take over accommodation		All	Admin	Works	
	1100-1200	Take over CSB					
	1200-1630	Prepare diving equipment	FWTA Portland	S1, J1	D	Diving	
	1630-1700	Task assessments Clean and maintain		CS	Admin	Works	
TUE 7	0800-0830	Move to Portland	Portland	All	Admin	Works	Haversack rations reqd
	0830-1630	Task assessments		S1, J1	D	Diving	
	1630-1700	Clean and maintain		CS	Admin	Works	
WED 8 Jul							
THU 9 Jul	0800-1600	Task assessments	FWTA	S1, J1	D	Diving	Haversack rations reqd Return CSB to RETC
	1600-1630	Clean and maintain	FWTA	CS	Admin	Works	
	1630-1700	Move to Portland		All	Admin	Works	
FRI 10 Jul	0800-1430	Task assessments	FWTA	S1, J1	D	Diving	Haversack rations reqd
	1430-1500	Clean and maintain	FWTA	CS	Admin	Works	
	1500-	Hand over accommodation	Wyke Regis	All	Admin	Works	
		Return to HMS NELSON after evening meal.		All	Admin	Works	

WEEK TWO - PORTLAND

DATE	TIME	SUBJECT CONTENT	PLACE	INSTR	TYPE	DRESS	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
MON 6 Jul		LONG WEEKEND					
TUE 7 Jul	0730-1000 1000-1100 1100-1200 1200-1630 1630-1700	Move to Portland Take over accommodation Take over CSB Prepare diving equipment Task assessments Clean and maintain	HMS Osprey Portland Portland	All All S1, J1 CS	Admin Admin D Admin	Works Works Diving Works	Tpt: 1 x 4 ton + tlr 1 x minibus CSB reqd 1100 to move to Portland.
WED 8	0800-1630 1630-1700	Task assessments Clean and maintain	Portland Portland	S1, J1 CS	D Admin	Diving Works	Haversack rations reqd.
THU 9 Jul							
FRI 10 Jul	0800-0830 0830-1600 1600-1630 1630-1700	Move to FWTA Task assessments Clean and maintain Move to Portland	FWTA FWTA	All S1, J1 CS All	Admin D Admin Admin	Works Diving Works Works	Haversack rations reqd. Return CSB to RETC.
SAT 11 Jul	0800-0830 0830-1430 1430-1500 1500-1530 TBN	Move to FWTA Task assessments Clean and maintain Move to Portland Hand over accommodation Return to HMS Nelson after evening meal	FWTA FWTA HMS Osprey	All S1, J1 CS All All All	Admin D Admin Admin Admin Admin	Works Diving Works Works Works Works	Haversack rations reqd.

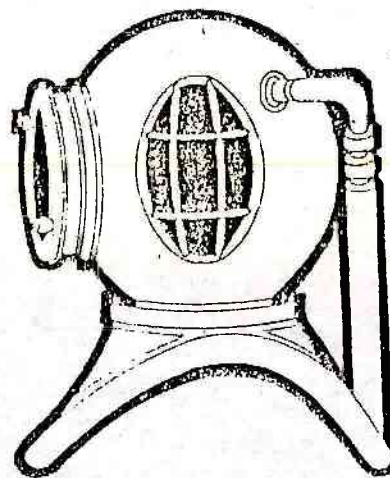
WEEK THREE

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
ON	0810-0855	CC Operation (2 comp)	CC	CIO	P	Works	Hand in homework 4,5 and 6.
3	0900-0945	Equipment inspection & documentation	CR	ID(A)	L	Works	1 x CSB: 1300-1700
il	0945-1015	Stand easy					1 x L/R: 1300-1700
	1015-1100	Team administration	CR	SMI	L	Works	
	1100-1150	Diving store administration & Stores Accounting	CR	RQMS	L	Works	
	1150-1300	Lunch					
	1300-1500	Task assessment			P		
	1500-1700	Task assessment			P		
JE	0800-1200	Task assessment			P		1 x CSB - 0800
l	1200-1300	Lunch					1 x 4 ton & 1 x minibus - 08
il	1300-1700	Task assessment			P		Haversack rations collect 07
ED	0800-1200	Task assessment			P	Works	1 x 4 ton & 1 x minibus - 08
5	1200-1300	Lunch	Galley				
il	1300-1330	Off-load vehs	Cage	CS	A	Works	
	1330-1600	CC Exam	CC	SDI, JDI	Exam	Works	
	1600-1630	Debrief	CR	SDI, JDI	A	Works	
IU	0800-1200	Theory Exam A & B	CR	SDI	Exam	Works	
5	1200-1300	Lunch	Galley			Works	
il	1300-1500	Theory Exam - Dive Planning	CR	SDI	Exam	Works	
	1500-1630	Cage Maintenance	Cage	CS	A	Works	
I	0800-0950	Hand over accom & return personal equip.		Accom/ G1198	A	Works	1 x minibus - KEPPEL Block - 0830
1	0950-1015	Stand easy					
	1015-1150	Course critique and presentation	CR	CO, SMI	A	Works	
	1150-1300	Lunch	Galley				
	1300-1345	Cage maintenance	Cage	CS	A	Works	
	1400-1545	Cage inspection & hand over	Cage	SDI, JDI	A	Works	
	1545-	Clearance and dispersal		SDI, JDI			

9

ARMY ADVANCED DIVING COURSE No

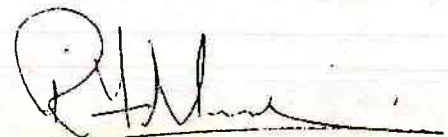
COURSE PROGRAMME



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4. Works Dress for all ranks is:
 - a. Winter
 - Clean, brushed beret
 - Shirt KF
 - Jersey wool heavy
 - Trousers/Lightweight
 - Boots Cbt, polished
 - Cbt Jacket as reqd
 - b. Summer
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 - Trousers/Lightweight
 - Regimental/Corps Stable belt or belts waist nylon
 - Boots Cbt, polished
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RE Diving Establishment

LEGEND

Admin	-	Administration
BS	-	Boat Store
CC	-	Compression Chamber
C	-	Cinema
CR	-	Class Room
CT	-	Clear Tank/EDU Trials Tank
CK	-	Creek
Cage	-	Course Cage
CTR	-	Creek Training Room
CSB	-	Combat Support Boat
D	-	Diving
Exam	-	Examination
Ex	-	Exercise
FWTA	-	Fast Water Training Area
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WEEK ONE

DATE	TIME	SUBJECT (CONTENT)	PLACE	INSTR	TYPE	DRESS	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
TUE 5 May	0810-0845 0845-0945 0945-1015 1015-1150 1150-1300 1300-1400 1400-1430	Arrival and documentation Medical Stand easy BFT Lunch Entrance exam Opening address	CR Sick Bay	CC -	Admin Admin	Works Works	Tpt: 1 x Mini-bus 1010-1200
	1430-1515 1515-1600 1600-1630	CC Dive Draw personal equipment Cage hand over Exam results and debrief	Horsea Galley CR CR	All S1 SOD(A), AI(D), SMI, S1, J1	PT Exam Admin	PT Works Works	
			CT G1198 Cage CR	S1, J1 RQMS J1 1, J1	Dive Admin Admin Admin	Works Works Works Works	
WED 6 May	0810-0855 0900-0945 0945-1015 1015-1100 1105-1150 1150-1300 1300-1500 1500-1545 1545-1630 1630-1645	DSSCCA Maintenance (R) Accident procedure Stand easy First Aid (R) O ² Resuscitators (R) Lunch Emergency procedures Load for Horsea Search schemes (R) Debrief	VS CR	J2 J1	P L	Works Works	Tpt: 1 x 4 ton 1500
			CR CR	S2 S2	L L	Works Works	
			Galley WT Cage CR CR	S1, J1 CS J1 S1, J1	D Admin L Admin	Diving Works Works Works	

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
THU 7 May	0800-0830	Move to Hersea		All	Admin	Works	Tpt: 1 x 4 ton) 0800 1 x minibus) HMS Nelson Rations Haversack. Collect 0800
	0830-1500	1. Single line jackstay 2. Grid search 3. Sector circular search 4. Compass swim	HI	All	D	Diving	
	1500-1530	Return to Vernon		All	Admin	Works	
	1530-1615	Unload					
	1615-1630	Clean and maintain Debrief	Cage CR	CS S1, J1	Admin Admin	Works Works	
FRI 8 May	0810-0855	Diving theory part one (R)	CR	S1	L	Works	
	0900-0945	Physiology and Illnesses one (R)	CR	S2	L	Works	
	0945-1015	Stand easy					
	1015-1100	Illnesses two (R)	CR	S2	L	Works	
	1105-1150	Diving theory parts two and three (R)	CR	S1	L	Works	
	1150-1300	Lunch	Galley				
	1300-1345	Cox's Bolt Gun	CR	CIO	L	Works	
	1345-1430	Tornado Bolt Gun (R) & Surface Firing	CR/GP	CIO	L/P	Works	
	1430-1445	Stand easy					
	1445-1615	Vixen (R) and Surface Cutting	LC	CIO	L/P	Works	
	1615-1630	Debrief	CR	S1, J1	Admin	Works	

WEEK TWO

DATE	TIME	SUBJECT CONTENT	PLACE	INSTR	TYPE	DRESS	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
MON 11 May	0810-0945	KMB - 1. Pre use 2. Setting up routines 3. After use routines	JTA	J1, CS	L/P	Works	
	0945-1015	Stand easy					
	1015-1150	KMB Introduction dive	JTA	S1, J1	D	Diving	
	1150-1300	Lunch	Galley				
	1300-1600	KMB - Vixen Tornado Cox's	JTA	S1, J1	D	Diving	
	1600-1630 1630-1645	Clean and maintain Debrief	Cage CR	CS S1, J1	Admin Admin	Works Works	
TUE 12 May	0745-0900	PT					
	0900-0945	Decompression - Methods & Rules (R)	CR	S1, J1 S1	PT L	PT Works	
	0945-1015	Stand easy					
	1015-1100	Decompression - Tables & Dive Logs	CR	S1	L	Works	
	1105-1150	Hydraulic Tool Pack (R)	BS	J1	L/P	Works	
	1150-1300	Lunch	Galley				
	1300-1600	Practical use - Hyd tool pack DSSCCA	JTA	S1, J1	D	Diving	
	1600-1630 1630-1645	Clean and maintain Debrief	Cage CR	CS S1, J1	Admin Admin	Works Works	

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
WED	0810-0855	Therapeutic Recompression	CR	AI(D)	L	Works	
13	0900-0945	OMCC Operation <i>Excluded as per</i>	Vesuvius	CIO	L/P	Works	
May	0945-1015	Stand easy					
	1015-1100	Two Compartment CC Operation	CT	CIO	L/P	Works	
	1105-1150	CC Dive	CT	S1, J1	D	Works	
	1150-1300	Lunch	Galley				
	1300-1545	KMB - Vixen Hyd Tool Pack	JTA	S1, J1	D	Diving	
	1545-1630	Clean and maintain	Cage	CS	Admin	Works	
	1630-1645	Debrief	CR	S1, J1	Admin	Works	
THU	0745-0855	Wet PT	CK	S1, J1	PT	Diving	
14	0900-0945	Charts and Tides	CR	SMI	L	Works	
May	0945-1015	Stand easy					
	1015-1100	Seaway Code	CR	SMI	L	Works	
	1105-1150	Set up dive site	JTA	CS	Admin	Works	
	1150-1300	Lunch	Galley				
	1300-1545	KMB - Scaffold cube Sluttering	JTA	S1, J1	D1	Diving	
	1545-1630	Clean and maintain	Cage	CS	Admin	Works	
	1630-1645	Debrief	CR	S1, J1	Admin	Works	

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
FRI	0810-0855	Endurance Calculations	CR	S1	L	Works	Tpt:
15	0900-0945	Industrial Compressor	JTA	S3	L/P	Works	Industrial Compressor to
May	0945-1015	Stand easy					
	1015-1100	Recovery methods & bouyancy calculations	CR	S1	L	Works	
	1105-1150	Set up dive site	JTA	CS	Admin	Works	
	1150-1300	Lunch	Galley				
	1300-1530	KMB - Air Lift DSSCCA - Buoyancy exercise	JTA	S1, J1	D	Diving	
	1530-1615	Clean and maintain	Cage	CS	Admin	Works	
	1615-1630	Debrief	CR	S1, J1	Admin	Works	

WEEK THREE

DATE	TIME	SUBJECT CONTENT	PLACE	INSTR	TYPE	DRESS	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
MON 18 May	0745-0855 0900-0945 0945-1015 1015-1100 1105-1150 1150-1300 1300-1600 1600-1630 1630-1645	PT OMCC Operation Stand easy Underwater concreting Set up dive site Lunch DSSCCA: 1. Construct sandbag base 2. Construct shuttering Clean and maintain Debrief	Vesuvius CR CK Galley CK Cage CR	S1, J1 S1 J1 CS S1, J1 CS S1, J1	PT P L Admin D Admin Admin	PT Works Works Works Diving Works Works	Fork lift reqd - 0900- Move RMD and base + demolition target to C
TUE 19 May	0745-0855 0900-1100 1100-1150 1150-1300 1300-1530 1530-1615 1615-1630	Wet PT Continuation of shuttering & prepare Tremig Practical underwater concreting Lunch DSSCCA - Vixen Clean and maintain Debrief	CK CK CK Galley CK Cage CR	S1, J1 S1, J1 S1, J1 S1, J1 CS S1, J1	PT D D D Admin Admin	Diving Diving Diving Diving Works Works	Crane reqd: 1015-1150 Readymix reqd: 1100

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
WED 20 May	0810-0855 0900-0945 0945-1015 1015-1100 1105-1150 1150-1300 1300-1630 1630-1645	Sewer Search Sewer gas detection equipment Stand easy AGA Prepare and load equipment Lunch Sewer search Debrief	CR CR VS Cage Galley P'mouth area CR	J1 J1 J2 CS S1, J1 S1, J1	L L L Admin D Admin	Works Works Works Works Diving Works	Tpt: 1 x 4 ton) 1100 WT 1 x minibus)
THU 21 May	0810-0855 0900-0955 1000-1015 1015-1100 1105-1150 1150-1300 1300-1600 1600-1630	Intermediate examination Underwater demolitions Stand easy Report writing Underwater survey Lunch Load for Portland Brief for Portland	CR CR CR CR Galley Cage CR	S1 SMI SMI Surveyor S1, J1 S1, J1	Exam L L L Admin Admin	Works Works Works Works Works Works	Tpt: 1 x 4 ton + tasker - 13' Remain loaded for Mon.
FRI 22 May		LONG WEEKEND					

WEEK FOUR - PORTLAND

DATE	TIME	SUBJECT CONTENT	PLACE	INSTR	TYPE	DRESS	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
MON 25 May	0800-1030 1030-1200 1200-1300 1300-1630 1630-1730	Move to Portland Take over accommodation Lunch Fast water search schemes Clean and maintain	HMS Osprey Calley FWTA HMS Osprey	All All All All	Admin Admin D Admin	Works Works Diving Works	Tpt: 1 x 4 ton + tasker. 1 x minibus First meal HMS Osprey - Authority to use RETC.
TUE 26 May	0800-1200 1200-1630 1630-1730	Cross load stores to fleet tender Work up dives (max 25m) Clean and maintain	Portland Portland Portland	All S1, J1 CS	Admin D Admin	Works Diving Works	Dockyard crane reqd 0830 Portland - cross 1 2 x OMCC + heavy stores Haversack rations reqd.
WED 27 May	0800-1630	Deep diving exercise - Portland area		S1, J1	D	Diving	Haversack rations reqd daily.
FRI 29 May							
SAT 30 May -SUN	0800-1630	Minewarfare River Recce Fast water search schemes	FWTA	S1, J1	D	Diving	Haversack rations reqd daily. Authority to use RETC

WEEK FIVE - PORTLAND

DATE	TIME	SUBJECT CONTENT	PLACE	INSTR	TYPE	DRESS	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
MON 1 Jun THU 4 Jun	0800-1630	Deep diving exercise - Portland area		S1, J1	D	Diving	Haversack rations reqd daily.
FRI 5 Jun	0800-0900	Hand over accommodation	HMS Osprey	All	Admin	Works	Dockyard crane reqd - 0900-1200 to off-load.
	0900-1200	Off-load fleet tender	Portland	All	Admin	Works	Haversack rations reqd.
	1200-1500	Return to Vernon		All	Admin	Works	Trpt:
	1500-1600	Rearrange 4 ton veh for Stokes Bay	Cage	CS	Admin	Works	1 x 4 ton to remain load
	1600-1630	Debrief Portland - brief Stokes Bay	CR	S1, J1	Admin	Works	for Stokes Bay.

WEEK SIX (Stokes Bay)

DATE	TIME	SUBJECT CONTENT	PLACE	INSTR	TYPE	DRESS	REMARKS
MON 8 Jun	0810-0855	Move to Stokes Bay	En route	All	Admin	Works	Tpt: 1 x 4 ton) 0810 1 x minibus) week
	0900-1100	Set up site	Stokes Bay	All	Admin	Works	
	1100-1600	U/W Survey of Target Area	Stokes Bay	All	Div	Diving	CSB reqd: 0810-1700 Mon-
	1600-1700	Move to Vernon Site	En route	All	Admin	Works	Haversack rations reqd.
TUE 9 Jun	0800-0900	Move to Stokes Bay	En route	All	Admin	Works	Haversack rations reqd.
	0900-1600	Preparation of targets	Stokes Bay	All	Div	Diving	
	1600-1700	Move to Vernon Site	En route	All	Admin	Works	
WED 10 Jun	0800-0900	Move to Stokes Bay	En route	All	Admin	Works	Haversack rations reqd.
	0900-1200	Place demolitions	Stokes Bay	All	Div	Diving	
	1200-1300	Blow demolitions	Stokes Bay	All	Div	Diving	
	1300-1600	Preparation of targets for recovery	Stokes Bay	All	Div	Diving	
	1600-1700	Move to Vernon Site	En route	All	Admin	Works	
THU 11 Jun	0800-0900	Move to Stokes Bay	En route	All	Admin	Works	Haversack rations reqd.
	0900-1600	Recovery of targets	Stokes Bay	All	Div	Diving	
	1600-1700	Move to Vernon Site	En route	All	Admin	Works	
FRI 12 Jun	0800-0900	Move to Stokes Bay	En route	All	Admin	Works	Haversack rations reqd.
	0900-1300	Survey of target area	Stokes Bay	All	Div	Diving	
	1300-1500	Clear site and move to Vernon	Stokes Bay	All	Admin	Works	
	1500-1600	unload, clean and maintain	Vesuvius	All		Works	

WEEK SEVEN

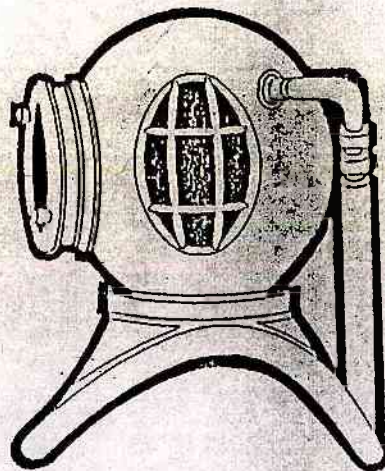
DATE	TIME	SUBJECT CONTENT	PLACE	INSTR	TYPE	DRESS	REMARKS
MON 15 Jun	0810-0855 0900-1150 1150-1300 1300-1600 1600-1630 1630-1645	Ships bottom search - theory Ships bottom search - practical Lunch Standard diving equipment <i>Duty in tank.</i> Clean and maintain Debrief	CR/JTA HMS Kent Galley WT Cage CR	J1 S1, J1 CIO CS S1, J1	L D D Admin Admin	Works Diving Diving Works Works	CSB reqd - 0900-1200
TUE 16 Jun	0810-1600 1600-1630 1630-1645	Wreck clearance - DSSCCA, Vixen, Hyd pack Clean and maintain Debrief	Hayling Island Cage CR	S1, J1 CS S1, J1	D Admin Admin	Diving Works Works	
WED 17 Jun	0745-0855 0900-1600 1600-1630 1630-1645	PT Practical cutting and bolting Clean and maintain Debrief	WT Cage CR	S1, J1 S1, J1 CS S1, J1	PT D Admin Admin	PT Diving Works Works	Tpt: 1 x 4 ton) 0800-1630 1 x minibus) CSB reqd - 0800-1630 Haversack rations reqd. Lunch in Vernon Galley.
THU 18 Jun	0810-1150 1150-1300 1300-1500 1500-1630 1630-1645	Practical test pieces Lunch Practical test pieces Clean and cage maintenance Debrief	WT Galley WT Cage CR	S1, J1 S1, J1 CS S1, J1	Exam Exam Admin Admin	Diving Works Diving Works Works	
FRI 19 Jun	0810-1150 1150-1300 1300-1500 1500-1630 1630-1645	Practical equipment tests Lunch Practical equipment tests Cage maintenance Debrief	Vernon Galley Vernon Cage CR	All All CS S1, J1	Exam Exam Admin Admin	Works Works Works Works Works	Additional staff reqd for test stands.
		<i>Exam requires both at Is there much work.</i>					

WEEK EIGHT

ATE	TIME	SUBJECT CONTENT	PLACE	INSTR	TYPE	DRESS	REMARKS
ON	0800-1000	Theory Part 1	CR	S1	Exam	Works	
2	1000-1030	Break					
un	1030-1200	Regulations Paper	CR	S1	Exam	Works	
	1200-1300	Lunch	Galley				
	1300-1500	Theory Part 2	CR	S1	Exam	Works	
	1500-1630	Maintenance	Vesuvius	CS	Admin	Works	
	1630-1645	Debrief	CR	S1, J1	Admin	Works	
UE	0800-1500	Visit BNPL	Alverstoke	All	Vis	Works	Tpt: 1 x minibus - 0800-1500 Haversack rations reqd.
3	1500-1630	Maintenance and cage handover	Cage	S1, J1	Admin	Works	
un							
ED	0800-0855	Handover accommodation	HMS	RQMS	Admin	Works	<u>Room Inspection:</u> 0800 hrs RQMS Rep.
4			Nelson				
un	0900-0945	Hand in personal kit	Vesuvius	RQMS	Admin	Works	
	0945-1015	Break					
	1015-1100	Course Critique	CR	SOD(A),	Admin	Works	
		Presentation of Log Books		AI(D);			
				SMI, All			
	1100-1200	Clearance	REDE		Admin	Works	
	1200-1300	Lunch	Galley			Works	
	1300-	Dispersal			Admin	Works	



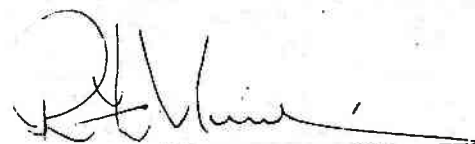
ARMY COMPRESSED AIR DIVING COURSE COURSE PROGRAMME



ROYAL ENGINEERS DIVING ESTABLISHMENT

ROYAL ENGINEERS DIVING ESTABLISHMENT
DISCIPLINE AND DRESS

1. The staff of the RE Diving Establishment is very small numerically and the majority of them are employed full time running courses. Morning Parades and Inspections therefore are not held, and reliance and trust is placed on the individual student to maintain a high standard of dress and discipline throughout this course. This trust is not to be abused.
2. The fact that soldiers are detached from their own units for a short period does not mean that they can wear any form of dress they desire or that haircuts are no longer necessary. On the contrary, living within a barracks belonging to another Arm or Service should induce a pride in oneself and ones own unit and corps, for students to be better turned out than they normally are.
3. Any student in obvious need of a haircut or who is found in an untidy state may have action taken to correct this state.
4. Works Dress for all ranks is:
 - a. Winter
Clean, brushed beret
Shirt KF
Jersey wool heavy
Trousers/Lightweight
Boots Cbt, polished
Cbt Jacket as reqd
 - b. Summer
Clean, brushed beret
Shirt KF, sleeves correctly turned back
Trousers/Lightweight
Regimental/Corps stable belt or belts waist nylon
Boots Cbt, polished
5. Frocks woollen white (ie jerseys white) and undersuits blue are NOT to be worn out of diving dress under any circumstances.
6. Students will be required to pay for stores losses which can be attributed to a particular individual and collectively for all other stores lost by the course which can be attributed to negligence.



R F MUNDY
Lieutenant Colonel RE
Commanding Officer
RE Diving Establishment

LEGEND

Admin	-	Administration
BS	-	Boat Store
CC	-	Compression Chamber
C	-	Cinema
CR	-	Class Room
CT	-	Clear Tank/EDU Trials Tank
CK	-	Creek
Cage	-	Course Cage
CTR	-	Creek Training Room
CSB	-	Combat Support Boat
D	-	Diving
Exam	-	Examination
Ex	-	Exercise
FWTA	-	Fast Water Training Area
Gym	-	Gymnasium
HI	-	Horsea Island
HW	-	High Water
JTA	-	Jetty Training Area 1 or 2
LT	-	Lesson Theory
LP	-	Lesson Practical
LW	-	Low Water
P	-	Practical
PT	-	Physical Training
R	-	Revision
SB	-	Sick Bay
Stores	-	RQMS Department (Vesuvius Building)
WT	-	Work Tank

External training areas will be shown by name,
eg. Horsea
Plymouth
Portland
Wyke Regis
etc

ROYAL ENGINEERS DIVING ESTABLISHMENT

CO - Lt Col R F Mundy RE
AI(D) - Capt I Ormesher RE
ID(A) - Capt H P Morgan RE
SMI - WO1 P A Thorpe RE

SENIOR DIVING INSTRUCTORS

Sgt Higginson RE (S1)

JUNIOR DIVING INSTRUCTOR

Cpl Brunton (J1)

COURSE SUPPORT NCO

LCpl Harvey (CS)

ADDITIONAL INSTRUCTORS

Mr Miller (CIO)
WO2 Wallace APTC (QMSI)
Cpl Leach (J2)
Cpl Grace (J3)
Cpl Lane (J4)

ADMINISTRATIVE STAFF

ROMS - WO2 Johnson RE
CC - Sgt Pilkington Re
Fitter - Sgt McCann RE
MT NCO - Cpl Boggi

ACAD 87/3

WEEK ONE

DATE (a)	TIME (b)	TYPE (c)	SUBJECT MATTER (d)	PLACE (e)	INSTR (f)	DRESS (g)	REMARKS (h)
TUE	0810-0850	Admin	Arrival & Documentation	CR	CC	Works	
22	0850-0900	Admin	Photo	Apt CR	All	Works	
Sep	0900-1100	Admin	Medical	S/Bay	All	Works	
	1100-1120	Admin	Move to Horsea Island		All	PT	TPT: 1055 & WT
	1120-1215	PT	BFT	HI	QMSI PT	PT	1 x 4 ton w/seats
	1215-1300		Lunch	HI			1 x minibus
	1300-1320	Admin	Return to Vernon Site				<u>Haversack rations</u>
	1320-1430	L/P	Intro to CC	CT	All	Works	
	1430-1500	Admin	Draw & mark diving suits	Stores	ROMS	Works	
	1500-1600	Admin	Course Intro & Opening Address	CR	All +	Works	
					SOD(A), AI(D),		
					SMI		
	1600-1630		Suit repair & maintenance	Cage	J1	Works	
WED	0745-0855	PT	Wet(PT) Methods of entry & surface swimming.	Ck	All	Diving	
23							
Sep	0900-0945	LT	Diving Theory One <i>Physical</i>	CR	S1	Works	
	0945-1015		Stand easy <i>Coffee</i>				
	1015-1100	LT	Physiology	CR	QMSI	Works	
	1105-1150	L/P	Diver Communications <i>L.L. signal</i>	MJ	J1	Works	
	1150-1300		Lunch	Galley		Works	
	1300-1340	LT	Panel Charging Techniques	Charging Shed	J1	Works	
	1345-1425	LT	DSSCCA Theory One	CR	J1	Works	
	1425-1450		Stand easy				
	1450-1530	LT	Resuscitation equipment	CR	QMSI	Works	<u>Issue Homeworks 01 and 09</u>
	1535-1630	PT	Suit Repair & Maintenance	Cage	All	PT	

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
THU	0810-0855	PT	PT (Dry)	Local	All	PT	
24	0900-0945		Laying out a dive site (1)	CT	All		
Sep	0945-1015		Stand easy				
	1015-1530	D	Introduction to Diving to include:- a. Familiarisation Dive - DSSCCA b. Flooded mask drills c. Emergency surfacing routines	HI	All	Diving	3 x extra standby divers reqd Horsea Is.
	1530-1630	Admin	Unload, clean and maintain	Cage	All	Works	<u>Issue Homework No.02</u>
FRI	0745-0855	PT	PT (Wet)		All	Diving	2 x extra standby divers
25	0900-0945	L/P	Laying out a dive site (2)	CE	J1	Diving	reqd
Sep	0945-1015		Stand easy				
	1015-1150	D	Practical Lifeline Signals	CK	All	Diving	
	1150-1300		Lunch	Galley			<u>Issue Homework No.03 & 04</u>
	1300-1535		Practical Lifeline Signals	CK	All	Diving	
	1535-1630	Admin	Charge, clean & maintain stores	Cage	All	Works	

WEEK TWO

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
MON	0810-0855	LT	Diving Theory Two	CR	S1	Works	
28	0900-0945	LT	Diving Illnesses One	CR	GMSI	Works	
Sep	<u>0945-1015</u>		Stand easy				<u>1 x extra SBD reqd</u>
	1015-1100	L/P	First Aid	CR	GMSI	Works	
	1105-1150	LT	Effects of Depth (Henry's Law)	CR	S1	Works	
	1150-1300		Lunch	Galley			
	1300-1345	LT	<u>Team 'A'</u> Accident procedure & underwater hazards	CR	J1	Works	
	1350-1430	L/P	Knots & Hitches	MJ	CS	Works	
	1430-1500		Stand easy				
	1500-1540	L/P	DSSCCA Theory Two	Valve Store	J2	Works	
	1540-1630	LT	Search Techniques - Theory	CR	J1	Works	
			<u>Team 'B'</u>				
	1300-1540	D	Hand Tools	CK	S1	Diving	<u>Issue Homework No.05 & 07</u>
	1540-1630	Admin	Clean and Maintain	Cage	All	Works	

(a)	(b)	(c)	(d)	(e)	(f)	(g)
TUE	0810-0855	LT	Decompression - Methods & Rules	CR	S1	Works
29	0900-0945	LT	Diving Illnesses Two	CR	GMSI	Works <u>1 x extra SBD reqd</u>
Sep	0945-1015		Stand easy			
	1015-1100	LT	Decompression Tables & Logs	CR	S1	Works
	1105-1150	LT	Diving Regulations	CR	AI(D)	Works
	1150-1300		Lunch	Galley		
	1300-1630	D	Teams A and B reverse programme from Mon 1300-1630	CR	S1 J1	Diving/ Works <u>Issue Homework No.06 & 08</u>
WED	0810-0855	LT	Compressors	MJ	J1	Works Tpt: 1100 WT
30	0900-0945	LT	Charts & Tides	CR	SMI/S1	Works 1 x 4 ton + tlr
Sep	0945-1015		Stand easy			1 x minibus
	1015-1100	LT	Seaway Code	CR	SMI/S1	Works 1 x L/Rover
	1100-1150	LT	Load for Horsea Island	Cage	All	Works
	1150-1230		Lunch	Galley		<u>2 x extra SBD's reqd</u>
	1230-1330	Admin	Move to Horsea Island		All	Works
	1330-1700	D	Introduction to marked swimming	HI	All	Diving
	1700-1745	Admin	Evening meal	HI	All	Works
	1745-1830	Admin	Maintenance	HI	All	Works <u>Issue Homework No.10 & 11</u>
	1830-	D	Endurance Swim	HI	All	Diving Night Ex.
THU	0730-0800	Admin	Breakfast	HI	All	Works <u>2 x extra SBD's reqd</u>
1	0800-0840	Admin	Set up dive sites + Laying a grid	HI	All	Diving
Oct	0840-1200	D	Team A - Compass S	HI	S1	Diving Tpt:
			Team B - Grid Search	HI	J1	Diving 1 x 4 ton + tlr
	1200-1300	Admin	Lunch	HI	All	Works 1 x L/Rover
	1300-1630	D	Teams A and B reverse	HI(AS)	All	Diving
	1630-1715	Admin	Evening meal	HI	All	Works
	1715-1830	Admin	Maintenance	HI	All	Works <u>Issue Homework No.12 & 14</u>
	2300-0300	D	Buddy Line Compass Swim	HI	All	Diving Night Ex.

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
FRI	0600-0700	PT	PT (Wet)	HI	All	Diving	<u>2 x extra SBD's reqd</u>
2	0730-0815		Breakfast			Works	
Oct	0815-0845	Admin	Set up dive sites	HI(AS)	All	Diving	Tpt:
	0845-1150	D	Long Swim	HI(AS)	All	Diving	1 x 4 ton + tlr
	1230-1330	Admin	Load, return to HMS Vernon		All	Works	1 x L/Rover
	1330-1630	Admin	Clean and maintain	Cage	All	Works	1 x minibus - Rep HI 1200
							<u>Issue Homework No. 15 & 17</u>

WEEK THREE

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
MON	0810-0855	PT	PT (Dry)		All	PT	
5	0900-0945	LT	Tornado Theory	CR	CIO	Works	
Oct	0945-1015		Stand easy				
	1015-1100	LT	Vixen Theory	CR	CIO	Works	
	1105-1150	L/P	Vixen Setting Up	WT	CIO	Works	
	1150-1230		Lunch	Galley			
	1230-1540	D	Underwater Cutting & Bolting	WT	All	Diving	
	1540-1630	Admin	Clean and Maintain		All	Works	
TUE	0810-1100	D	Introduction Dive to 18m Decom Ex.	CT	All	Diving	Haversack rations.
6	1100-1540	D	Companion Diver Drill. Surface Tow and EAR.	CT	All	Diving	Tank to 5 mtrs depth.
Oct	1540-1600	Admin	Clean and charge	CT	All	Works	Officers to dive first -
	1605-1700	R	Revision	CR	All	Works	See UDS Syllabus.

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
WED	0800-0930	Ex	Intermediate exam/OAD exam	CR	S1	Works	Other Arms Students.
7	0930-1015	LT	SDDE Theory One	CR	J4	Works	
Oct	1015-1100		SDDE Theory Two	CR	J4	Works	
	1100-1500	D	Familiarisation dive SDDE	WT	All	Diving	
	1500-1630	Admin	Return stores, clean and Maintain	Cage	All	Works	
THU	0810-0855	L/P	Hydraulic Tool Pack Theory	BS	J1	Works	OAD Practical tests - 3 x staff reqd for stands
8	0900-0945		Set up dive site	CK	All	Works	
Oct	0945-1015		Stand easy				
	1015-1150	D	Underwater cutting & bolting, use of Hydraulic Tools	CK	All	Diving	
	1150-1230		Lunch				
	1230-1540	D	Underwater cutting & bolting, Use of Hydraulic Tools	CK	All	Diving	Issue homework No.18 & 19
	1300-1630		OAD Practical Tests				
	1540-1630	Admin	Clean and maintain	Cage	All	Works	
FRI	0745-0855	PT	PT Wet		All	Diving	
9	0900-0945	Admin	Set up dive sites	WT	All	Diving	
Oct	0945-1015		Stand easy				
	1015-1150	D	Underwater cutting & bolting	WT	J1	Diving	
	1150-1230		Lunch				
	1300-1540	D	Underwater cutting & bolting	WT	All	Diving	
	1540-1630	Admin	Clean and maintain	Cage	All	Works	

WEEK FOUR

MON
12
Oct

LONG WEEKEND

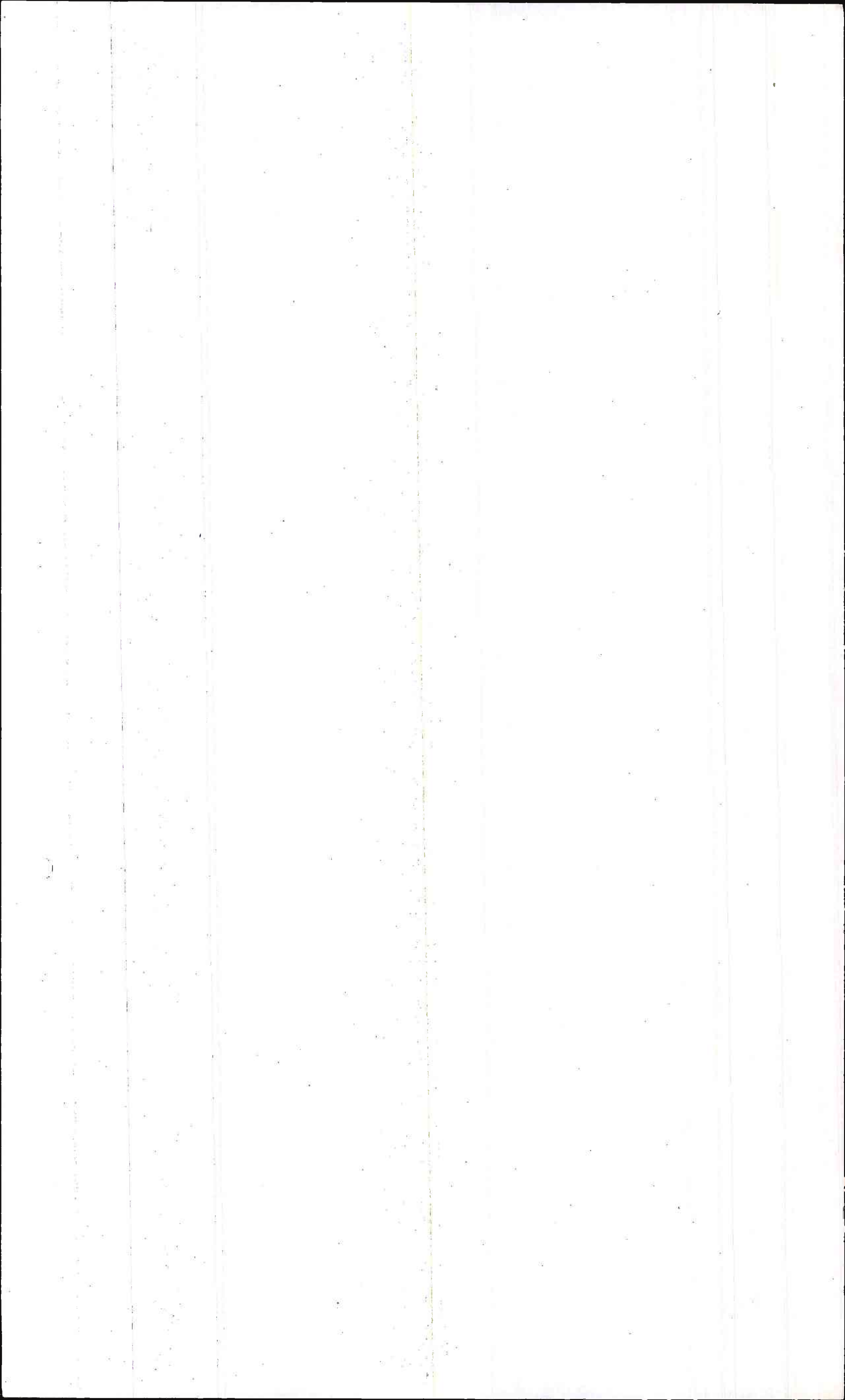
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
TUE	0810-0855	LT	Recovery methods & buoyancy	CR	J1	Works	
13	0900-0945	D	Set up site	MJ/CK	All	Diving	
Oct	1015-1530	D	3 Legged Circuit: 1. Airlift/Waterjet 2. Hydraulic Tools	MJ/CK	All	Diving	Haversack rations.
	1530-1630	Admin	Clean and maintain	Cage	All	Works	
WED	0810-0855	LT	River Recce & Beach Profile	CR	J1	Works	
14	0900-0945	LT	Set up dive site	CR		Works	
Oct	1015-		Buoyancy task				
	-1530	LT	Single Line Jackstay	MJ/CK	All	Diving	
	1530-1630	Admin	Clean & Maintain	Cage	All	Works	

1 x L/Rover + tlr
1 x Minibus

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
THU	0810-0855	Admin	Load CSB		All	Works	Haversack rations reqd
13	0855-1530		Deep Dive Exercise		All	Diving	
Oct	1600-1630	Admin	Clean and maintain		All	Works	
FRI	0810-1840	LT	Endurance Calculations <i>Calculus leave</i>	CR	S1	Works	
14	0845-0945		Dive Logs (revision)	CR		Works	Haversack rations
Oct	0945-1015		Break				
	1015-1100		Minelaying & Recovery (revision)	CR		Works	1 x-4 ton + tlr
	1100-1530		Load for Weymouth	Cage	All	Works	
SUN	0810-1000	Admin	Move to Weymouth		All	Works	
6	1000-1200	Admin	Take over Accommodation CSB and diving facility	RETC Chickereall	All	Works	Haversack rations
Oct	1200-1300		Lunch				
	1300-1700	L/P	Intro to OBM's & small boat handling - Assault boat & Gemini	RETC	All	Diving	

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
MON 19 to TUE 20 Oct	0800-1700	D	Fast water diving Single Line Jackstay Search Drift Search Mine laying & Recovery River Recce Night Diving	RETC	All	Diving Works Works	Haversack rations
WED 21 Oct to THU 22 Oct	0800-1700	D	18 mtr Diving Buoyancy Task Bolt Guns Scaffold construction Decompression Ex Marked Swimming Exercise	WT Portland	All All	Diving Diving	Haversack rations reqd
FRI 23 Oct	0800-1000 1000-1400 1400-1500 1500-1630	Admin Admin Admin	Clean & hand over boats and accommodation Return to Vernon Site Unload vehicles Clean and maintain	Chickeraill RETC Cage Cage	All All All All	Works Works Works Works	Haversack rations

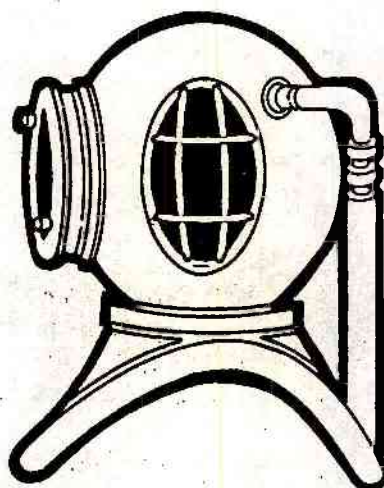
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
MON	0800-1015	Ex	Diving Theory Test	CR	S1	Works	
26	1015-1150	D	CC Dive to 50m	CT	All	Works	
Oct	1230-1600	D	Introduction to other equipment	CT	J1, CS	Diving	Haversack rations
	1300-1500	Ex	UDS Supervisory Paper	CR	S1	Works	CT to 8mtrs depth
	1600-1630	Admin	Clean & maintain.	Cage		Works	
TUE	0800-0900	Admin	Set out test stands		All	Works	
27	0900-0915	Admin	Briefing	CR	All	Works	
Oct	0915-1500	Ex	Practical Tests		All	Works	Haversack rations
	1500-1630	Admin	Clear test stands, cage maintenance		All	Works	Additional staff reqd for testing.
WED	0800-0900	Admin	Hand over accommodation	Nelson	ROMS	Works	
28	0900-0945	Admin	Hand in diving kits	Store	ROMS	Works	
Oct	0945-1015		Break				
	1015-1100	Admin	Clean changing rooms & cage, carry out clearance routine	Store	J2	Works	
	1100-1130		Course critique	CR	AI(D), SMI(D) + all	Works	
	1130-1150		Presentation of Log Books	CR	SOD(A)	Works	
	1150-		Course dispersal		All		





REDE PRECIS
ADS/UDS No. 2

OCT 84



PREPARATION FOR AND PLANNING DIVING TASKS

PREPARATION FOR AND PLANNING DIVING TASKS

References:

- A. BR 2806 The Diving Manual.
- B. REDE Precis ADS/UDS 1 Orders.

INTRODUCTION

1. In all diving tasks success depends on adequate preparation and planning. Without such preparation there is sure to be misfortune. Diving accidents do not just happen, they are caused. They can usually be avoided by considering the hazards involved before the dive and planning the dive to minimise the risk. The diving supervisor is responsible for the conduct of the diving operation and the safety of all members of the team. (Article 2204 Ref A).
2. The sequence of events prior to all diving operations described in detail below may be summarised as follows:

Reconnaissance
Time Appreciation
Plan
Orders or briefing
Move to site
On site briefing
Task
On site debriefing
Recovery
Main debriefing

TASK PREPARATION

3. The supervisor must make use of his 2i/c, who will ideally be an AAD or otherwise the most experienced diver available, to carry out concurrent activity. The sequence of events in the preparatory stage is as follows:
 - a. Site Reconnaissance Supervisor acquires all the relevant information required to carry out an appreciation.
 - b. Task Appreciation The appreciation is described in full in paras 11 onwards. The principle elements are:
 - (1) Aim of task.
 - (2) Factors - site, equipments, manpower, tactical, Time.
 - (3) Courses open - sites, equipments, tps to task.
 - (4) Plan.
 - c. Time Appreciation After arriving at an outline plan, estimate the time required for each phase and work backwards from the projected or required completion time to arrive at the correct 'start time'. Wherever possible, allocate an additional 25% to your estimate of time required for the execution phase to allow for 'unforeseen' delays.

ORDERS

4. Issue a warning order when possible, to allow the 2i/c to commence stores checks and loading. Write task orders and deliver to the team. (Ref A).

MOUNTING

5. The mounting phase incorporates 3 elements:

- a. Stores loading and move to site.
- b. Site preparation and layout of stores.
- c. On-site briefing (confirmatory orders).

EXECUTION

6. If the preparation and mounting have been carried out efficiently, the execution will minimise the time spent in the water. This is most important when carrying out operational tasks under adverse conditions or when the diving task is a forerunner to an amphibious operation.

7. On site the supervisor is responsible for:

- a. Pre-dive checks.
- b. Supervision of all team members.
- + c. On-site debrief of team.

8. An aide-memoire to on-site checks is given at Annex A.

RECOVERY

9. It is particularly important that post dive procedures are carried out at this stage. The welfare of those who have been in the water is to be considered and the remainder of the team should be occupied with the following:

- a. Clear site of all stores and equipment.
- b. 'Stand Down' the safety organisation, ie. Compression Chamber, Standby vehicle, Ops room, coastguard etc.
- c. Return to unit, clean and maintain stores.
- d. Cater for team welfare with showers, changing facilities, hot meals etc.

10. After all the actions listed above are complete, the Supervisor is to conduct a final debrief to bring to the attention of the team its strengths and failings, and conclude with 'lessons learned'.

DIVING TASK APPRECIATION

11. The task appreciation is a most important element of preparation to dive. If the appreciation is hurried or incomplete, the Supervisor may miss any one of a number of factors affecting the safety of team members. Not all the factors in the following sequence are relevant to every diving task; it is left to the discretion of the individual Supervisor to omit those which are not relevant.

12. Aim The aim of the task should be clearly defined. It will usually be one of the following:

- a. Reconnaissance
- b. Search
- c. Survey/inspection
- d. Construction
- e. Demolition (not cutting or explosive)
- f. Lifting

13. Factors

a. Water

- | | |
|---------------------------------|---------------------------|
| (1) Sea-water (tidal) | (9) Lock gates |
| (2) Fresh water | (10) Sluices penstocks |
| (3) Tidal flow | (11) Inlet/outfall |
| (4) Current speed | (12) Visibility |
| (5) Depths minimum and maximum | (13) Natural obstructions |
| (6) Width of channel | (14) Manmade obstructions |
| (7) Traffic | (15) Type of bottom |
| (8) Times of high and low water | |

b. Weather

- (1) Current met state
- (2) Met forecast
- (3) Long range forecast
- (4) Time of last light and first light

c. Ground

- | | |
|------------------------------|-------------------------------|
| (1) Routes to site | (7) Shelter from weather |
| (2) Access to site | (8) Height of water table |
| (3) Launch sites for craft | (9) Local geology |
| (4) De-launch site for craft | (10) Authorisation for access |
| (5) Harbour areas | (11) Services available |
| (6) Hard standing | |

d. Manpower

- | | |
|-------------------------|----------------------------------|
| (1) ADS/UDS | (8) Cook |
| (2) Unit Diving Officer | (9) General duties |
| (3) AAD/ACAD | (10) Medic |
| (4) Untrained Attendant | (11) Technical experts |
| (5) Boat Operator | (12) Local contact (Wallmeister) |
| (6) Drivers | (13) REME |
| (7) Crane Operator | |

e. Safety Organisation

- (1) Compression Chamber
- (2) Hospital
- (3) Medical Centre/sick bay
- (4) Telephone/radio net
- (5) Safety vehicle(s)

f. Administration

- | | |
|------------------------------------|----------------------------------|
| (1) Base/harbour area | (13) Postal svce |
| (2) Water | (14) Pay |
| (3) Rats/POL Replen | (15) Chaplain/welfare |
| (4) Air supply/compressor | (16) Waste/rubbish disposal |
| (5) Explosives - issue and storage | (17) Ablution facility |
| (6) Transport; parking and veh sy | (18) Dress - div, works, PT, Civ |
| (7) Mov, routes. | (19) Plant - cranes, tugs, ECP |
| (8) Special to task diving stores | (20) Maps - lg/small scale |
| (9) Accn/site shelter | (21) Sy - eqpts/ammo/plans |
| (10) Veh Sp - REME | (22) Power supply, light, heat |
| (11) Medic/FAK | (23) Chem decontamination |
| (12) Hospitals | |

g. Time and Space Considerations

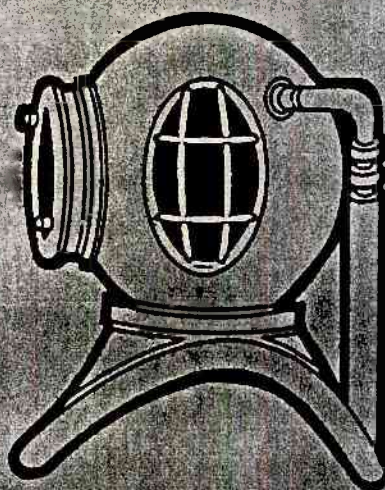
- (1) Available daylight - first/last light
- (2) Tide pattern
- (3) Sequence of events
 - i. Plan recce
 - ii. Recce
 - iii. Brief Team
 - iv. Prepare eqpt
 - v. Mov
 - vi. Task
 - vii. Recovery
 - viii. Debrief

h. Command and Signals

- (1) Command Sturcture
 - OIC
 - 2IC
 - Tasking officer
 - Liaison officer(s)
- (2) Comms
 - i. Harbour area to unit
 - ii. Harbour area to dive site
 - iii. On site
 - iv. Telephone network
 - v. Report system
- (3) Safety
 - i. Safety org
 - ii. Phone no. of hosp, CC, QHM/HM Coastguard, police, Wallmeister, ferry operators.
- (4) Contact/Liaison
 - i. Tasking authority
 - ii. Harbour/intermediate halts
 - iii. Police
 - iv. ATO
 - v. Int & sy
 - vi. Dist HQ



REDE PRECIS
AAD No. 7
June 84



UNDERWATER DEMOLITIONS

SUPERVISORS AIDE MEMOIRE

CHECKLIST PRIOR TO START OF DIVING OPERATION

1. General Checks Before Starting Operations

- a. Are all the interested authorities in the area informed of the diving operation? ie, operators of sluice gates or locks, ships engineer etc.
- b. Are the divers 'in date' medically and in accordance with AGAI/BR 2806.
- c. Is the standby diver qualified to the deepest depth to be dived?
- d. If free or marked swimming is planned, have the divers carried out an ESD in the last 30 days? (At supervisors discretion with effect from issue of change 6 to BR 2806).
- e. Is the equipment up-to-date for tests and inspections?
- f. Do you know where the nearest telephone/radio is?
- g. Do you know where the nearest hospital is? (telephone no).
- h. Do you know where the nearest compression chamber is? Is it 'stood-by'?
- j. Is there a copy of BR 2806 available?
- k. Is a resuscitator and first aid kit available on site?
- l. Is a standby vehicle available?

2. Checks to be Made on Commencing Diving Operations

- a. Are the 'Diving in Progress' flags or lights displayed?
- b. If free or marked swimming, are thunderflashes available?
- c. Is the standby diver appointed and at the appropriate state of readiness with diving equipment correctly laid out?
- d. Do those remaining at the surface know their tasks in the event of an emergency, including the standby vehicle driver?
- e. Has the water depth been checked?
- f. Have the divers been briefed?
- g. Is medical equipment on site, resuscitator checked and ready for use?

3. Checks to be made Before diver enters the water

- a. Is the diver dressed correctly?
- b. Cylinder contents.
- c. Lifeline or float line correctly tied.
- d. Diver checks position of his own equipment, under direction of Supervisor:
 - (1) Shoulder strap buckles.
 - (2) Waist strap buckle must open in opposite direction to weight belt.
 - (3) Weight belt buckle.
 - (4) SIU fitted correctly and charged to 205 bars.
 - (5) Knife.
 - (6) Reserve cylinder valve (on and off)
 - (7) Nose clip.

4. Checks before diver leaves the Surface

- a. Attendant to check diver for leaks from set.
- b. Does the diver have all the tools required to carry out his task?
- c. Note time diver leaves surface.

5. Checks whilst diving is in progress

- a. Attendant to maintain communication with diver.
- b. Supervisor to check attendant(s) alertness.
- c. Supervisor to maintain watch for approaching vessels.

UNDERWATER DEMOLITIONS

Reference: ME Vol II Pam 4 1980.

INTRODUCTION

1. Generally the techniques required to carry out demolition tasks underwater are much the same as those used on dry land with added problems posed by depth, current or poor visibility. Therefore the risk of mishap and misfires is much greater. The difficulty involved in returning to a demolition site to correct a misfire is considerable; untangling and recovering the ring main is a slow and delicate task. Time, as in all diving tasks, will work against the supervisor who must consider total time under compression and, quite often the availability of a short 'tidal window' in which work can be completed.

AIM

2. The aim of this precis is to describe the safety precautions, procedures and techniques used in underwater demolitions.

SAFETY PRECAUTIONS

3. Whilst carrying out underwater demolitions, all normal safety precautions laid down in chapter 9 of the reference apply. The essential precautions are listed below:

- a. No smoking within 50m of explosives.
- b. Minimum number of pers to be employed on the preparation of the demolition.
- c. Do not tamp explosives with metal.
- d. Keep explosives and detonators separate.
- e. Never bury detonators.
- f. Minimum length of safety fuse to be used is 300 mm.
- g. Strictly observe the required safety distances.
- h. Minimum of 2 persons in a firing party.
- i. Wait 30 mins before inspecting a misfire, or 10 mins if initiated electrically.
- j. All fixing studs are to be fired into the target before placing charges.
- k. Never mix dummy explosives and accessories with live.
- l. Treat dummy as live.

4. Additional Precautions for Underwater Demolitions. As follows:

- a. All pers, divers and/or swimmers, must leave the water before the charge is initiated.
- b. Initiate at the surface or on dry land.
- c. Allow for safety fuse to burn faster should a long length trail below the surface of the water. Safety fuse should not be coiled when initiating.
- d. If operating from a boat the motor is to be kept running and the slack taken up on the anchor cable.
- e. An alternative means of propulsion ie paddles, must be available in the boat.
- f. Crew of craft must be fully briefed as to action to be taken in the event of engine failure.
- g. Minimum crew in boat.
- h. Do not use detonators underwater. (Unless commercial explosive stores designed for u/w use are available).
- i. Do not drill boreholes closer than 2m to a previously charged hole.

THEORY

5. To understand the effects of an explosion underwater it is useful to remember what an explosion is:

'An explosion is a chemical reaction in which the original material is rapidly converted into gases so that pressures of about 50,000 bars, and temperatures of about 3,000°C are created. This reaction is called 'detonation'. A detonation wave travels at speeds from 1,500 m/sec to 9,000 m/sec'.

6. Underwater, the reaction forms a sphere of gases which displace the surrounding water at speeds greater than sound (approx 1,500 m/sec in water). This produces an intense pressure wave. As the gases expand so the pressure drops.

7. The most important phenomenon associated with underwater explosions is the action of the sphere of gas between detonation and venting at the surface. The bubble oscillates up to 10 cycles, creating secondary pressure pulses, (water borne shock waves), and is attracted to rigid boundaries rather than to the water surface. The effect of this shock wave must be taken into account when planning underwater demolitions in close proximity to rigid structures below the water level.

APPLICATION

8. Many underwater tasks can be very efficiently carried out using service explosives. Typical applications include:

- a. Fragmentation of rock pinnacles, bed rock, hard coral and conglomerates.
- b. Cutting or clearing of trenches in rock, conglomerates and soft sediments.
- c. Breaking and scattering of wrecks and obstructions.
- d. Dismantling of seabed structures prior to their removal; such as anchor chains, platforms, piers etc.

- e. Destroying in-situ unwanted ordnance such as mines and bombs.
- f. The removal of marine growth and cleaning areas prior to inspection.

EXPLOSIVES AND ACCESSORIES

9. At present there are no special explosives or accessories issued for underwater tasks; however, PE4 and the present range of accessories are ideal for underwater use provided one or two simple rules are followed. 808 and the older range of accessories do not have the same water resistant qualities and therefore require very thorough preparation. If success of a demolition is essential it is strongly recommended that PE 4 be used.

10. Shaped charges are also ideal for underwater use providing the stand-off is sealed from the surrounding water to create an air gap. (See illustrations in Annex A).

11. The Barmine, Mk 7 Anti tank mine and Bangalore Torpedo can also be used as underwater demolition charges.

CALCULATIONS

12. Calculation of charges is the responsibility of a class one combat engineer and they are normally the same as those used for surface charges. A guide to charge calculations and application is given below:

- a. Cutting Charge. Weight same as for use on the surface with similar results. Economy of explosives is good.
- b. Breaching and Pier Footing Charges. Weight same as for use on the surface with good results. However poor economy of explosives with large water borne shock waves.
- c. Borehole Charges. Weight same as for use on the surface with similar results. Economy of explosives is good, few waterborne shock waves.
- d. Mined Charges. These are possible but heavy overloads of explosive are required to get good results.
- e. Concussion Charge. Generally ineffective underwater. However, a form of concussion charge can be used for removal of wrecks. Poor economy of explosives with large water borne shock waves.
- f. 'Bulk Blasting' (Plaster Shooting). Not used on the surface. Ideal for breaking up submarine rock or to create trenches in silt and sand. Very poor economy of explosives with very large water borne shock waves.

TAMPING

13. Charges placed at a depth of 3.5m or more need not be tamped. (Pressure 1.35 Bar abs).

WATERPROOFING

14. A demolition charge made up, placed underwater and detonated shortly afterwards will not be affected by immersion.

15. If a charge is to be left submerged for more than one hour, an effort must be made to prevent water penetrating the explosive. Ideal materials for water-proofing are:

- a. Plastic bags or sheet knotted and sealed with masking tape.
- b. Fire hoses.
- c. Vehicle inner tubes.
- d. Waxed paper (shallow depths only).
- e. Tin foil (shallow depths).
- f. Plastic containers of various kinds.
- g. Standard Ordnance ammunition boxes.

16. Special care must be taken to achieve a good seal where the detonating cord enters the charge. Ideal materials for this junction are:

- a. Bitumastic (tar).
- b. Plumbers sealing compound.
- c. Presticon.
- d. Car body filler or fibre glass resin on rigid containers.

EFFECT OF IMMERSION ON ACCESSORIES

17. Water will affect accessories in various ways as described below:

- | | |
|--|--|
| a. <u>Safety Fuse</u> | - Will burn underwater. Rate of burning is increased by depth. Will not burn if damp at point of initiation. <u>It should therefore only be initiated at the surface.</u> |
| b. <u>Detonating Cord</u> | - Will detonate underwater. Must have a minimum of 300mm spare end. The outer plastic cover is more easily damaged when wet. Water entering the open end will not penetrate more than 300mm. |
| c. <u>Detonator 27 or L1A1</u> | - Normal means of initiation at the surface. |
| d. <u>Detonator 33 or L2A1 (electric)</u> | - If used at all must be initiated on the surface. Care should be taken to waterproof joint to cable. |
| e. <u>Primers (old range of explosives only)</u> | - Will detonate underwater, provided the wax coating is not damaged. May be resealed with varnish. |
| f. <u>Firing Device, Demolition Grip</u> | - Is likely to leak if immersed and therefore will fail to ignite. Should be fired <u>above</u> water line only. |

g. Initiator Flash L3A2

- Initiation set c/w detonator should be made up in the dry.

h. Plastic Coupler

- Will provide a waterproof joint between detonator and safety fuse.

TECHNIQUE

18. Reconnaissance. A thorough reconnaissance of the target is essential to determine the methods of attack, fixing charges and quantity of explosive required.

19. Preparation. Targets underwater are often attached in conditions of little or no visibility. It is important, therefore, that maximum preparation of the demolition is carried out on the surface so that the work required to place charges underwater is reduced, if possible, to attaching a made-up charge to the target.

20. Placing Charges. All current techniques used on the surface apply to the placing of charges. Use of the amphibious cartridge gun to fire fixing studs into the target will greatly reduce the divers work and make fixing charges far easier. Examples are shown at Annex B. The following rules are to be followed:

- a. All studs are to be fixed into place before explosives are attached.
- b. The charge must be placed and secured in direct contact with the target. Water between the charge and the target will greatly reduce the effect of the charge. If shaped charges are used an artificial air gap must be created.
- c. Charges should be placed so as to achieve maximum effect from the direction of detonation.
- d. Where more than one charge is used, all the charges must be placed and secured before the det cord leads are connected. The ring main leading to the surface is then completed.

21. Det Cord Junctions. Det cord leads must have a minimum of 300mm spare end. Junctions which have to be made underwater should be secured with either

- a. Light gauge binding wire.
- b. Thin cord or spun yarn.
- c. Plastic ties.

d. Where junctions are made up on the surface prior to immersion black masking tape is the most suitable. In all cases junctions must have a minimum length of 100mm contact between det cord leads.

22. Initiation. All charges must be initiated with double thumb knots of detonating cord embedded in them. The detonating cord is initiated from the surface using safety fuse. Detonating cord leads may therefore be quite long and are subject to currents or tidal flow. They should be carefully sited and supported by attachment at intervals along the length to a light line secured to the target. The lead must run up to float on the surface upon which the initiation set is set up. A typical underwater demolition set up is shown in diagram 1 at Annex C.

23. During training or operations it may be necessary to recover part of the target. If so a recovery line and float are to be connected to the target. The first 15m of recovery line is weighted to sit on the bottom to prevent the line being cut during detonation. The system is illustrated in diagram 2 of Annex C.

24. Final Inspection. After detonation the target is to be inspected by a diver to ensure that the required result has been achieved and that all charges have detonated.

25. Misfires. In the event of a misfire wait 30 minutes or 10 minutes if electrically detonated. Remove the means of initiation then send down a diver to investigate.

CUTTING CHARGES

26. These are used in exactly the same way as on the surface. 3.5m or more depth of water provides a good tamping effect of explosive against the target. All normal rules apply, as summarised below:

- a. The charge must be continuous over the complete line of cut.
- b. The charge must be in close contact with the target. This is particularly important underwater, where a 'wet gap' will severely reduce the effect of the charge.
- c. The width of the charge should be between one and three times the thickness.
- d. Charges placed on either side of a target must not directly oppose each other.
- e. With long charges initiate every 1.5m along the length; or if using charges L3A1, every fourth slab.
- f. The direction of initiation must be perpendicular to the target.

27. Improvised Linear Charges. A simple but very effective cutting charge can be made by filling a copper pipe with PE4 and sealing it at both ends. This charge is then bent to conform to the shape of the target.

28. Pile Cutting. To cut a single pile or upright obstruction below seabed level, proceed as follows: Diagram 1 at Annex D refers.

- a. Excavate a 1m pit around the base of the pile.
- b. Calculate weight of explosive weight of explosive required and make up into a necklace charge at least 1.3 times the circumference of the pile.
- c. Lower the charge down over the pile on a light line, complete with the initiation lead, into the pit around the base.
- d. Keep one side of the necklace charge elevated so as the charge lies at an angle around the pile. Back fill the hole and tamp the charge into position.
- e. Initiate. Remove cut pile.

BOREHOLE CHARGES

29. The most economic method of using explosives is to insert and tamp the charge into a hole. This is most suitable when the bench height (the height or thickness of rock to be removed) is more than 2m.

30. A template should be used by the diver to ensure that the holes, which must be plugged to prevent backfilling after they are drilled, are correctly spaced and that they can be relocated with ease. A good template can be made of scaffolding as shown in diagram 1 & 2 at Annex E.

31. Where overburden and backfilling is likely to be a problem, the drill is passed through an outer casing which penetrates the sediment to the surface of the base rock. The charge is then loaded down a tube and the risk of the hole filling-in is eliminated. This is illustrated in diagram 3 of Annex E.

32. A rough guide for calculation is about 1 Kg of explosive per cubic metre of rock to be removed. This ensures good fragmentation and allows for misfires. The quantity can be reduced by 10% if the holes are drilled at an angle of 1 in 3 to the horizontal.

33. In general, about two thirds of the borehole is filled with explosive. Spacing between holes will depend on the charge concentration while the depth of drilling should equal the 'bench height' plus the hole spacing.

BULK BLASTING/PLASTER SHOOTING

34. This involves the use of bulk explosives to break up submarine rock or to create trenches in silt and sand. It is to be used in depths of not less than 8m as it relies on the head of water to tamp down the charge and because it can produce high levels of water-borne shock. A typical pattern would involve 22.5 Kg (50lb) charges spaced at 2m intervals, as illustrated in figure 1 at Annex F.

35. A trench through soft material can be blasted using a single line or boreholes. Approximately $\frac{1}{2}$ Kg (1lb) of explosive per .75m should produce a trench 1m deep by 2m wide at the mud line. See Figure 2 Annex F.

36. An alternative method which enables a trench to be blasted in one operation, is to attach charges to a weighted rope; initiation is effected by detonating cord threaded through the top of each charge. See Figure 3 Annex F.

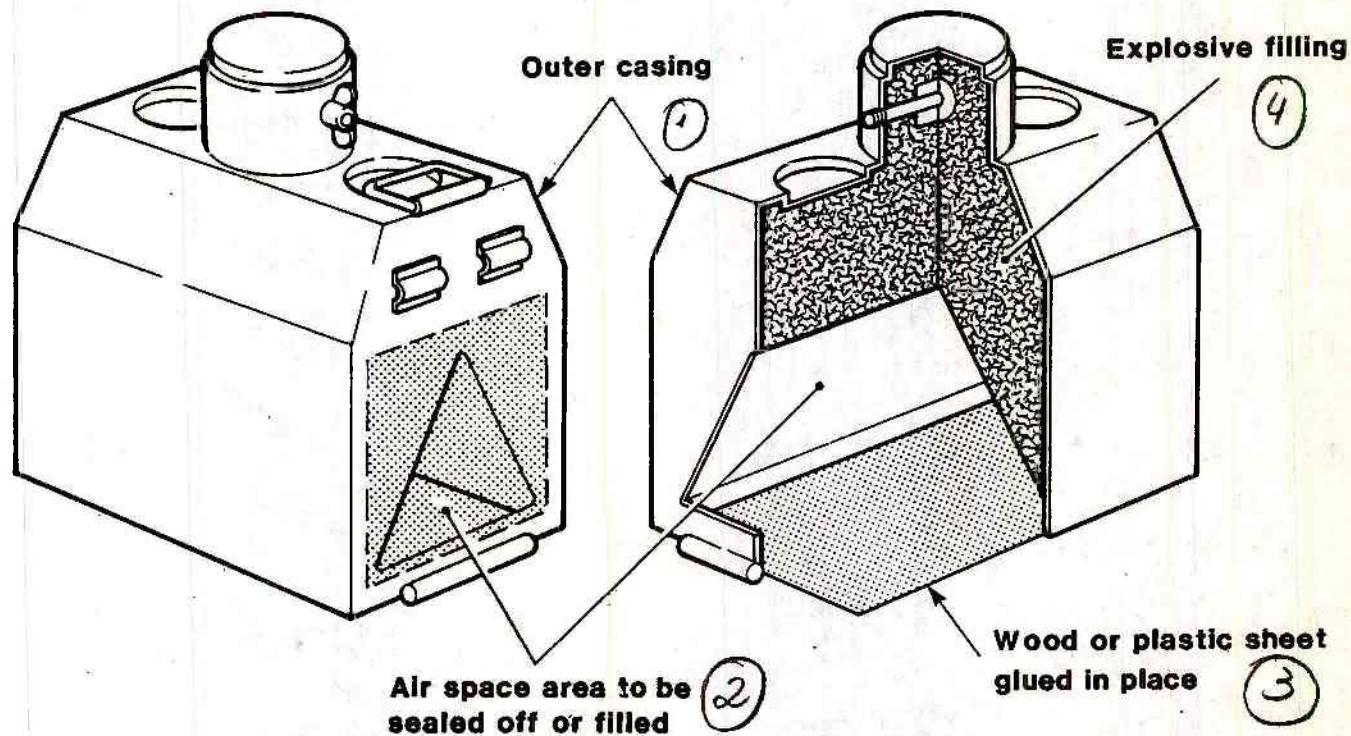
WRECK DISPERSAL

38. Underwater wreck dispersal is simplified by the use of explosives. Small vessels up to 60m long or 1,000 tonnes displacement may often be broken up by firing three heavy charges of explosive, one in the forepart, one amidships and one aft. The size of the charge depends on the construction of the ship and the depth of water but as a guide, a ship of 1,000 tonnes will require a total charge of about 454 Kg (1,000 lb), approximately half of this being placed amidships and the remainder divided equally fore and aft. The resultant heavy surge of water helps to level the sides and plates loosened by the explosion. Further charges may afterwards be required to break up boilers etc.

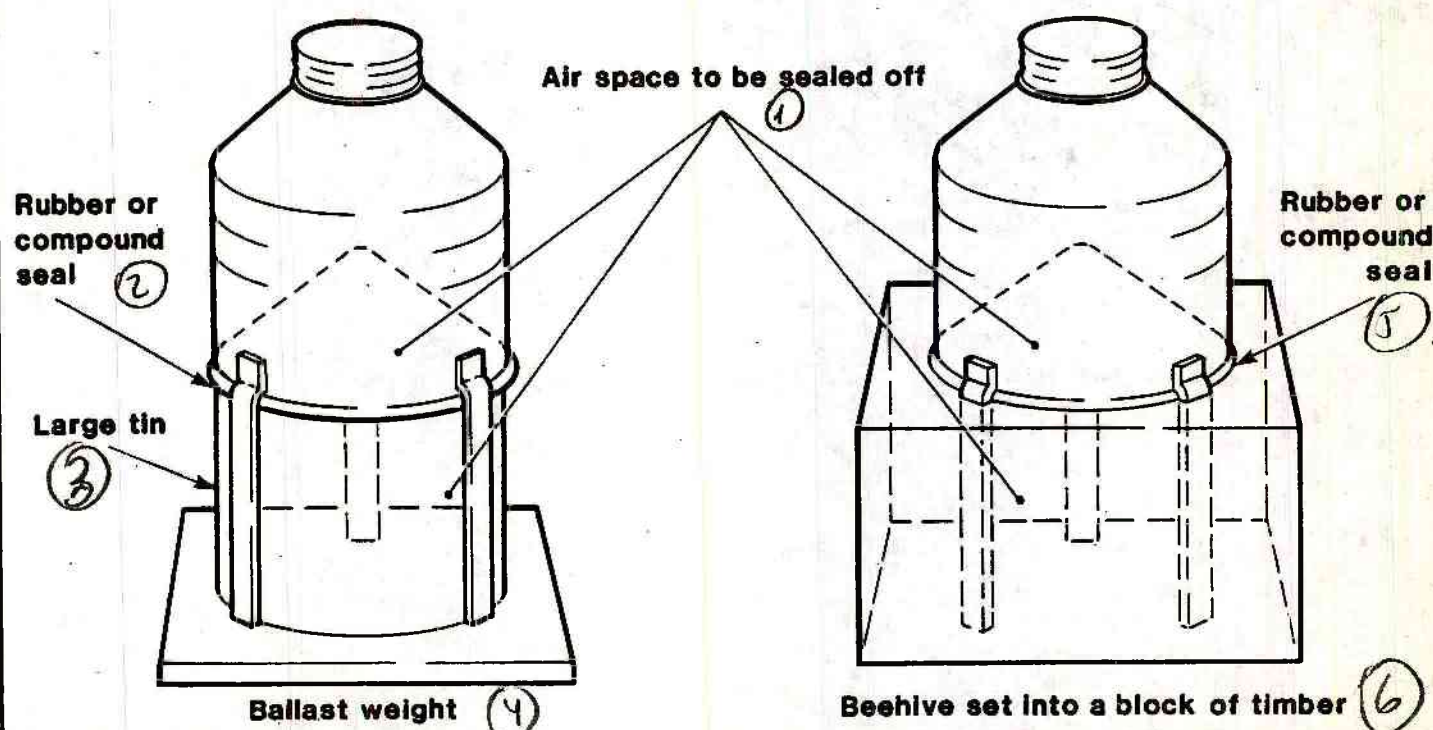
SHAPED CHARGES PREPARED FOR UNDERWATER USE

ANNEX A to
REDE Precs
AAD No.7
May 84

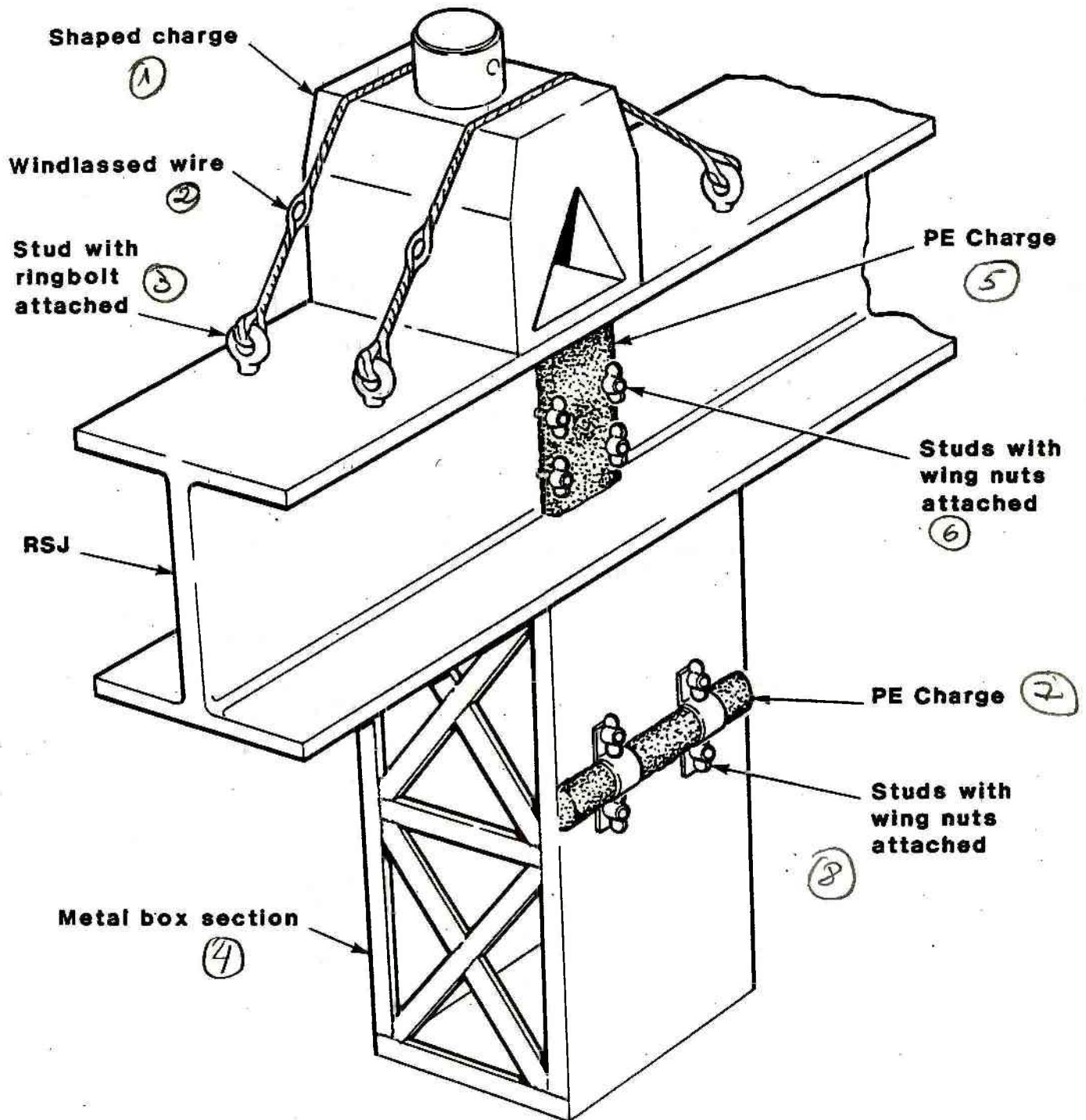
Diag.1 Charge demolition No.14 (Hayrick) Mk.1



Diag.2 Charge demolition No.1 (Beehive) Mk.3



Diag.1 Example of chages fixed with a cartridge hammer



CUTTING A PILE OR UPRIGHT OBSTRUCTION

Gráfico 3

ANNEX D to
REDE Precise
AAD No.7
May 84

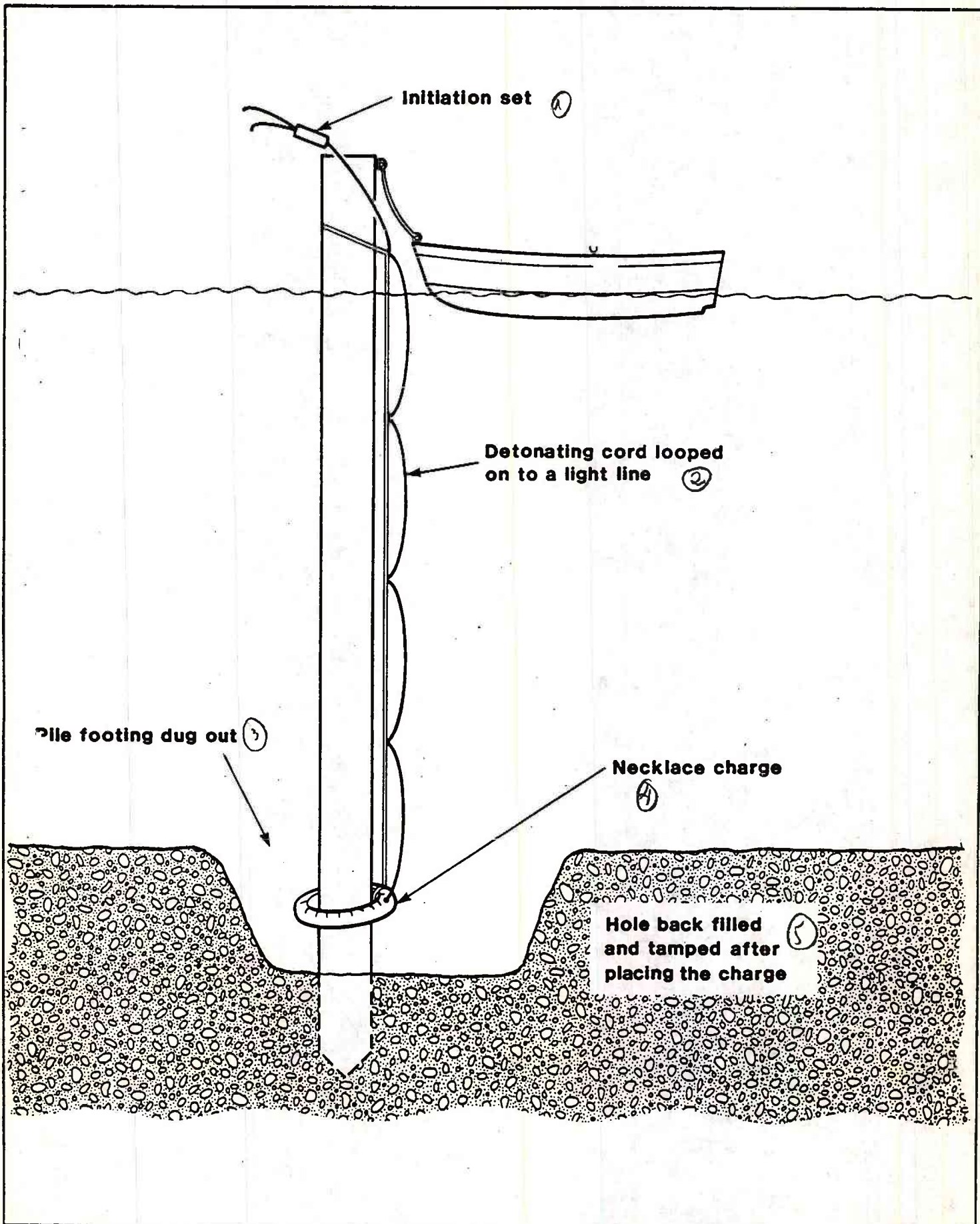
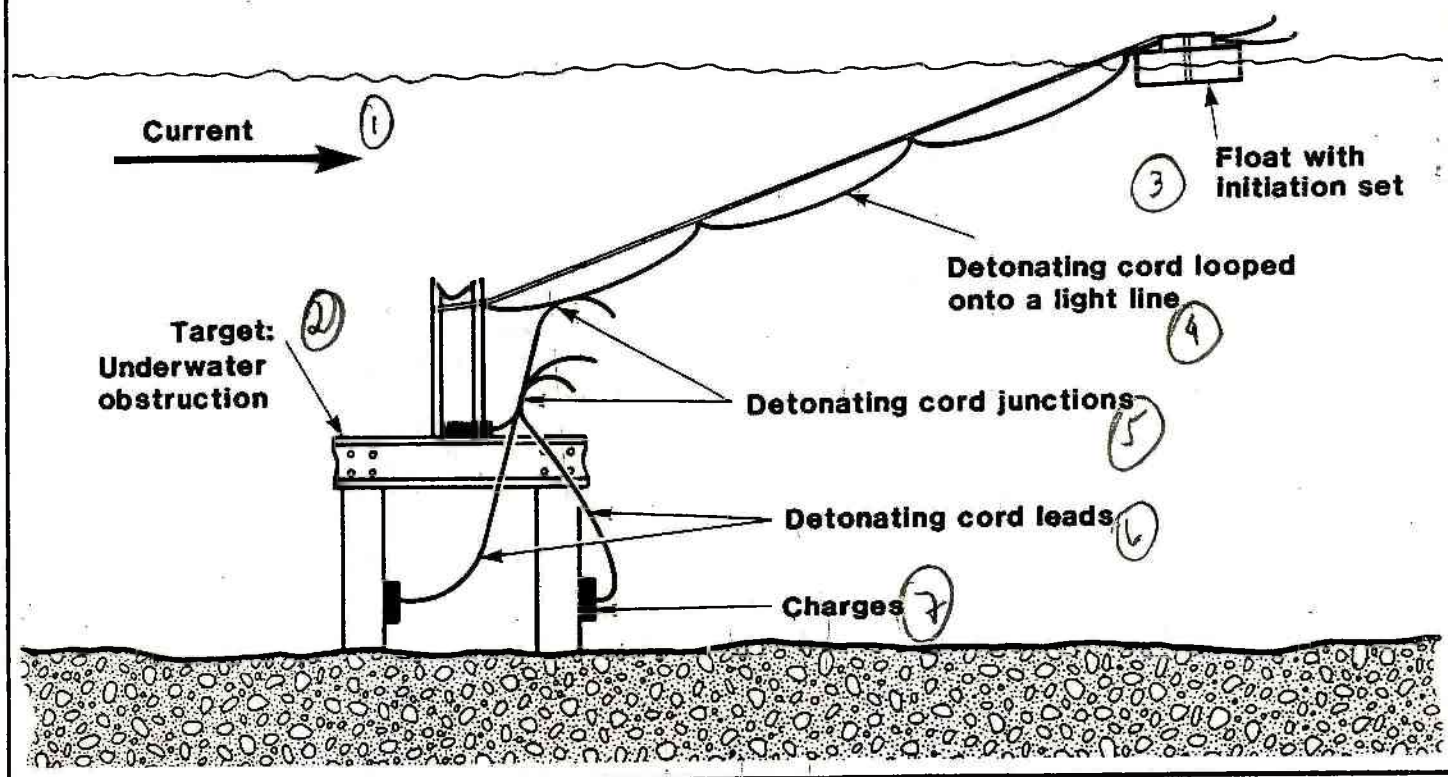


Gráfico 4

ANNEX C to
REDE Précis
AAD No.7
May 84

Diag.1 View of typical underwater demolition set up



Diag.2 Target recovery for training purposes

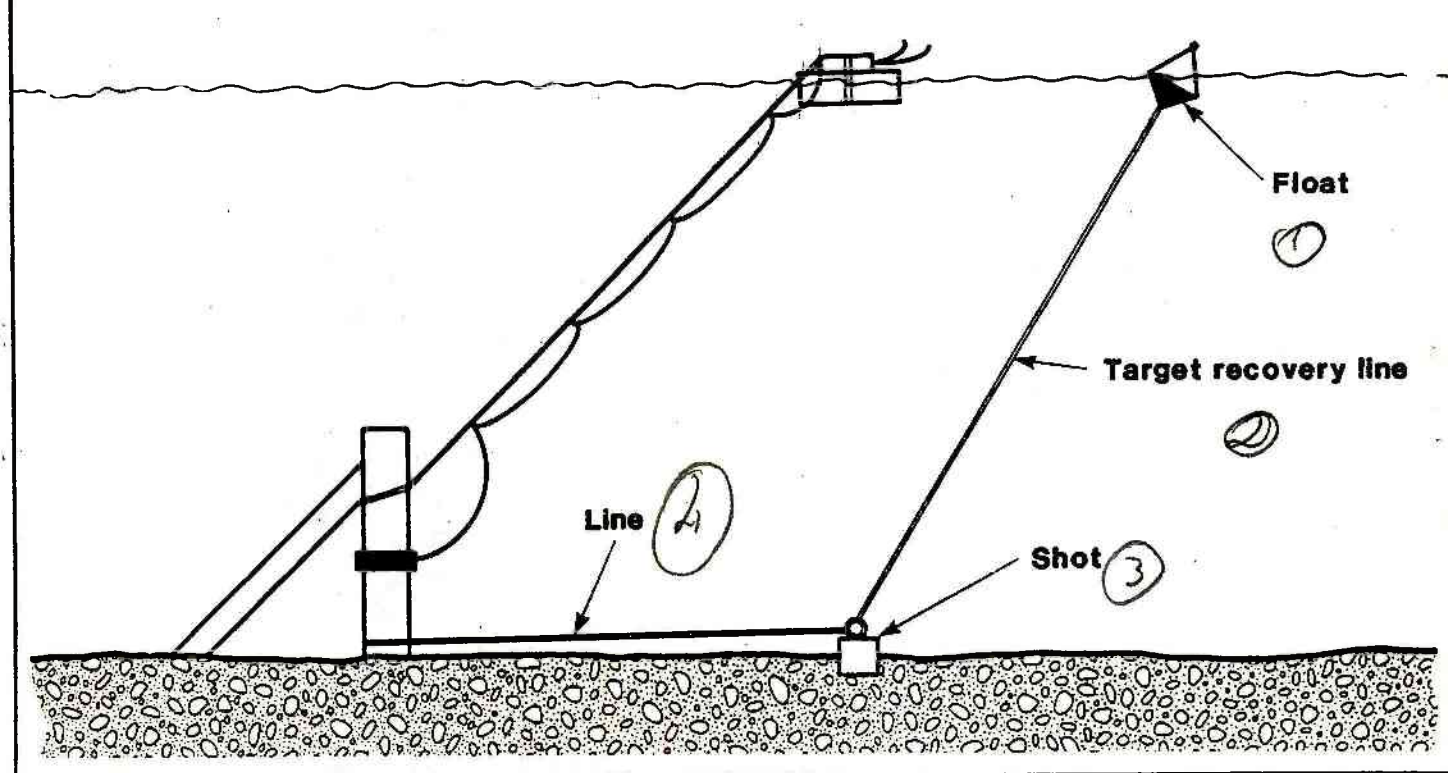
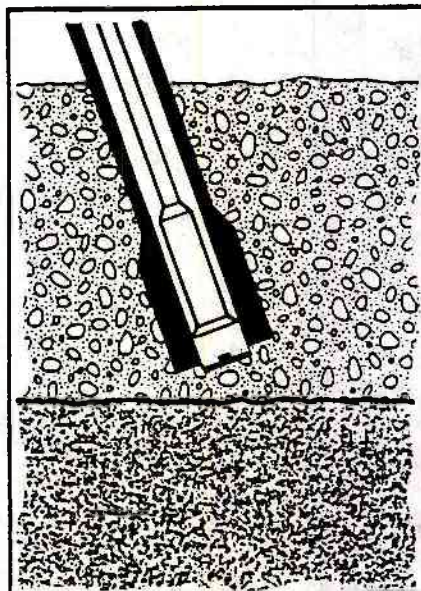
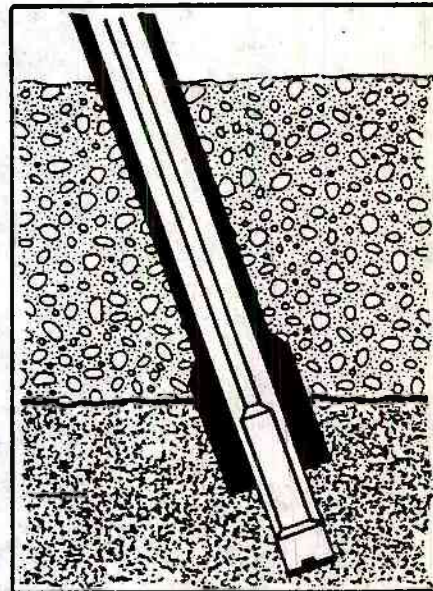


Gráfico 5

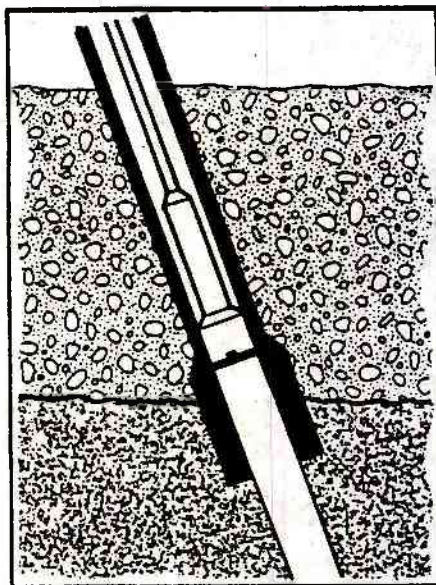
Diag.3 Drilling a borehole



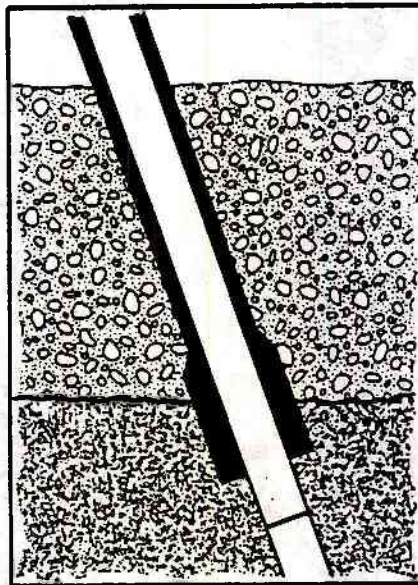
1. Predrill tube and drill bit penetrates overburden



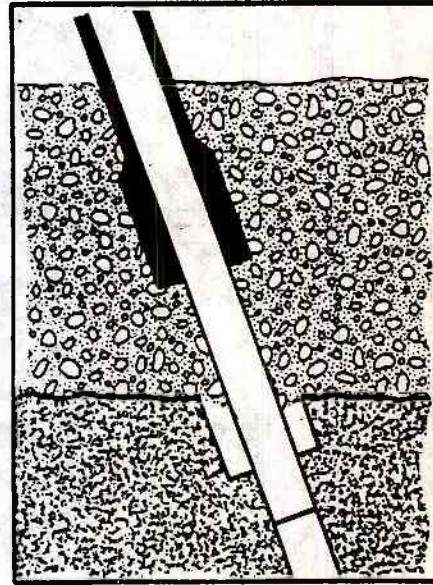
2. Predrill penetrates rock, rock drill cuts hole



3. Drill bit withdrawn



4. Plastic tube inserted



5. Predrill bit withdrawn

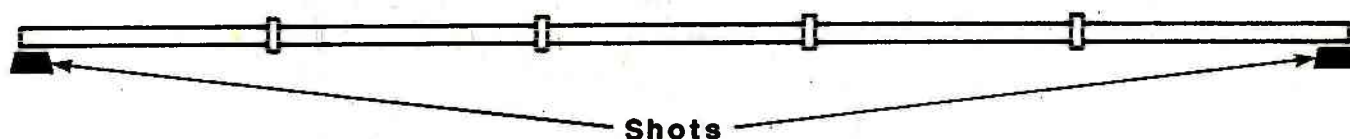
When using manual drilling method a template should be used by the diver to assist in lining up the holes. Holes should be plugged as they are made and drilling should never be carried out closer than 2m from charged drill holes.

BOREHOLE PATTERN TEMPLATE

Gráfico 6

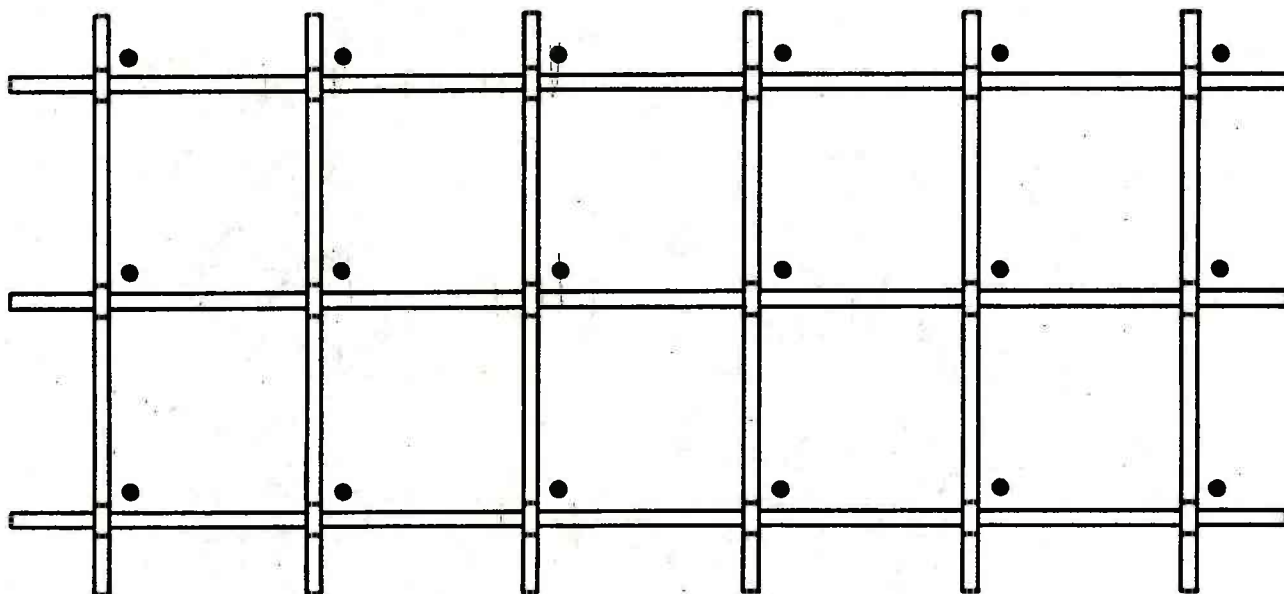
Diag.1 Single line

Scaffold tube with easily definable marks, ie scaffold clamps, at proposed interval marks at proposed hole centres.



Diag.2 Multi line

Scaffold frame with junctions forming interval marks for hole centres.



Note: Holes should be drilled on the same side of each junction.

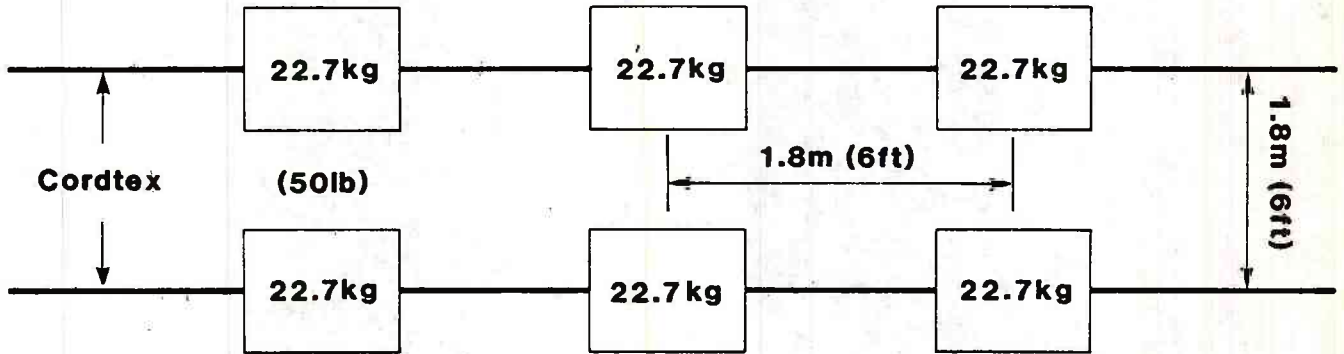
Det cord leads should go under the frame to ensure snagging does not occur on removal of the frame.

After charging the holes and connecting the det cord leads the frame should be lifted from one side with the diver ensuring that the det cord does not snag.

PLASTER SHOOTING

Gráfico 7

Fig.1. Plan section of typical plaster shot underwater



BLASTING TRENCHES ACROSS RIVERS

Fig.2. Single line method

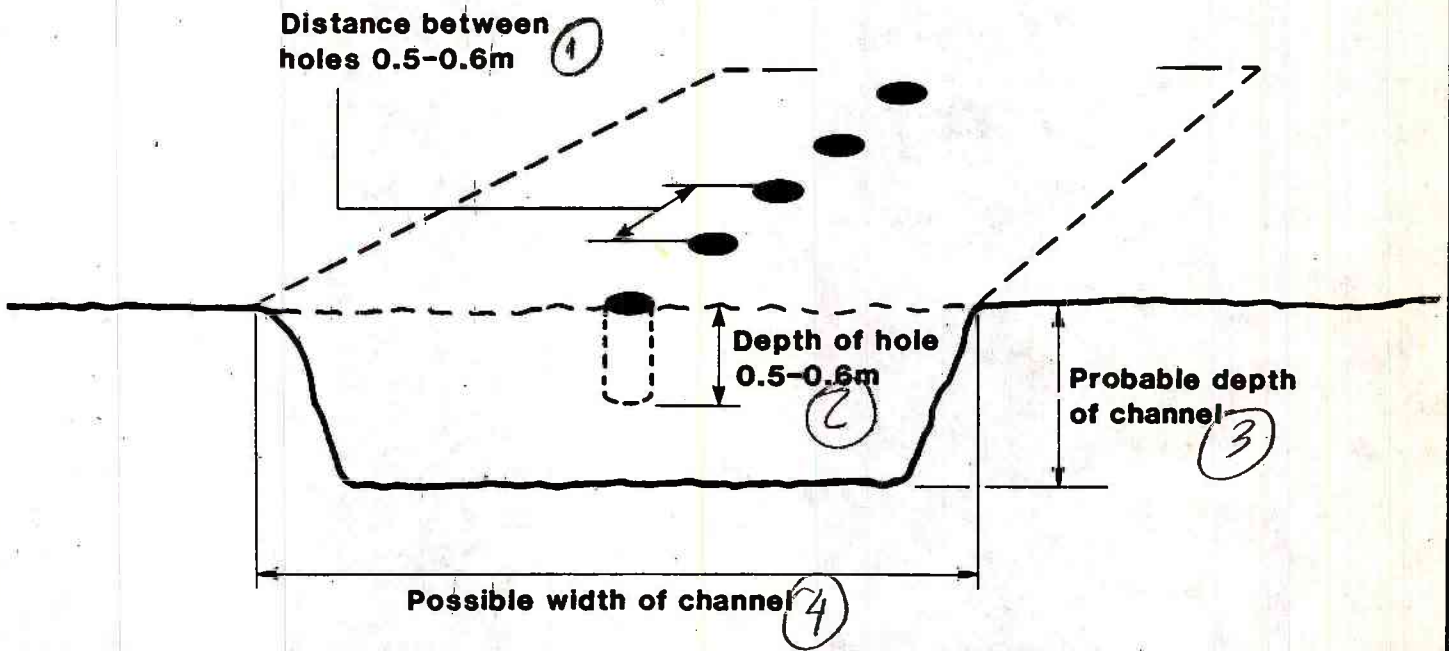
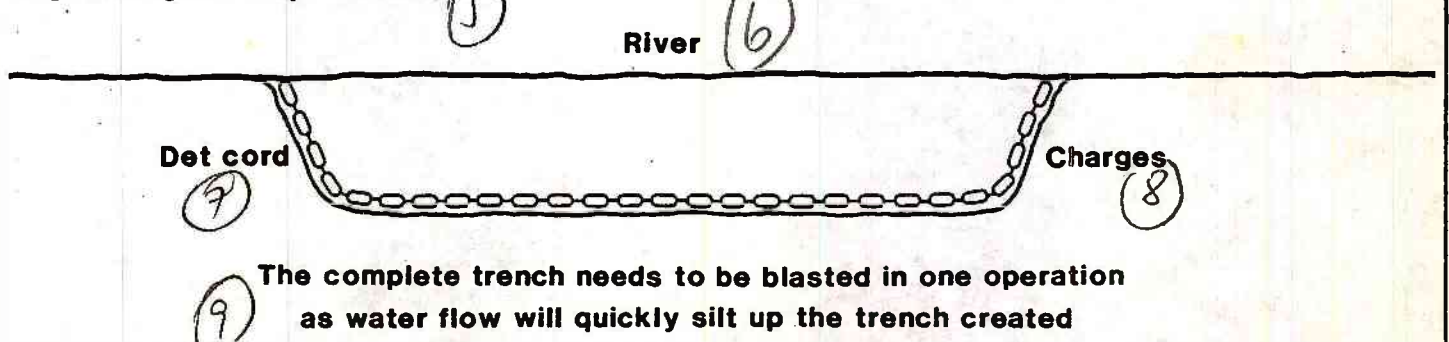
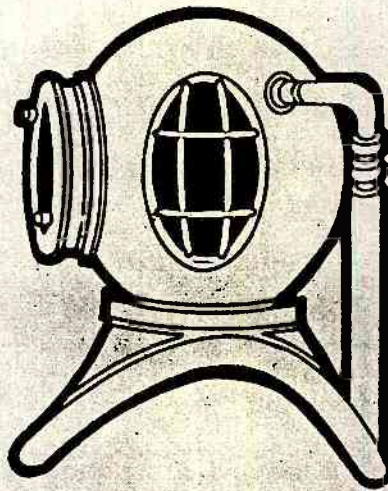


Fig.3. Weighted rope method





RIVER RECONNAISSANCE

RIVER RECONNAISSANCEINTRODUCTION

1. To assist military operations which may entail crossing rivers or canals, there is often a need for a detailed reconnaissance of the underwater section of the obstacle. The aim of the following reconnaissance drill is to measure and record the details across a river at the given point, to enable a scaled drawing in the form of a line profile to be made.

STORES

2. The stores required are basic and should be easily acquired in any Engr unit are listed below:

- 1 x Recce Boat
- 2 x OPH Set
- 1 x 35mm Snatch Block (Cordage)
- 1 x Hammers Sledge
- 1 x Fall of 35mm Cordage (Approx 100m) marked off 2m intervals
- 1 x Set Depth Rods
- 1 x Flange Reel c/w D10 Cable
- 1 x 30m Tape
- 1 x Plumb Line
- 4 x 0.3m Wooden Pickets
- 1 x Prismatic Compass
- 2 x Pocket Radios (not essential)

TASKS

3. To obtain the information required so that later we are able to make out a river profile, there are 7 tasks that have to be undertaken:

- a. Supervisor (ADO or ADS)
- b. Diver
- c. Diver's Attendant
- d. Recce boat operator
- e. Depth Rod man
- f. Recorder
- g. Standby Diver

4. In some cases it may be necessary to combine the tasks depending on the speed of the current and width of the river. Some examples of how the tasks may be combined are listed below:

- a. Narrow Fast River
(Crew of 2 in Recce Boat)
 - (1) Supervisor/Recorder
 - (2) Diver
 - (3) Diver's Attendant/Recce Boat Op
 - (4) Depth Rod Man
 - (5) Standby DiverTeam of 5 covering 7 tasks
- b. Wide Slower River
(Crew of 3 in Recce Boat)
 - (1) Supervisor/Depth Rod Man
 - (2) Diver
 - (3) Diver's Attendant/Recce Boat Op
 - (4) Standby Diver/RecorderTeam of 4 Covering 7 tasks

DETAILS TO BE RECORDED

5. The measurements from the waters edge out to a depth of about 3m are likely to be the most critical, and therefore should be taken at closer intervals than in mid-stream over this depth. The measurements to be taken together are:

- a. Distance from waters edge
- b. Depth
- c. Nature of the bottom

6. The details are recorded on a proforma as the recce progresses. An example of which is at Annex A.

DRILL

7. The following details outline the drill which will produce the information required, but it may have to be varied to suit local conditions.

- a. The cordage is rigged across the river and tensioned with the aid of the snatch block and holdfasts.
- b. The recce boat is attached on the down stream side of the cordage.

- c. The diver's life line is attached to the recce boat and the crew take their positions in the boat.
 - d. The depth of the water is measured at the waters edge and then every metre or suitable distance along the centre line.
 - e. Each time the depth of the water is measured the diver goes down the depth rod and examines the nature of the bottom, on returning to the surface he reports his findings to the recorder.
 - f. The diver then holds on to the recce boat while it is moved along the centre line to its new position where the whole process is carried out again and so on until the far bank is reached.
8. It may be that only part of the river needs to be reconoitred.
eg the banks and a set distance out for swimming vehs; the centre for bridges piers etc in which case the above drill is tailored to suit.

BANK DETAILS

9. To allow for the rise and fall of the river the banks on both sides are measured and included in the report. The method of measuring the bank is similar to that used when taking the depth of the water. The Maximum Bank Height is measured, at given points the distance from this level to ground level is measured and one is subtracted from the other, so giving the length of the bank above water level. See Annex B.

OTHER INFORMATION

10. The following details are also required to complete the recce and are listed on the proforma:

- a. Location; Grid Ref, Map Sheet.
- b. Description and GR of DATUM POINT. (A datum point is a fixed point to which the water level can be related).
- c. Height of datum above water level.
- d. Speed of current; a float is timed over 30m and related to a chart, Annex C to determine the speed of the current.
- e. Direction of current; S-N, E-W etc, can be obtained from a map.
- f. Size of wet gap.
- g. Direction of recce.
- h. CIC, Unit, Date etc.

ADDITIONAL INFORMATION

11. The following details may also assist to fill out the picture on some sites.
- a. Compass bearing taken along the recce centre line.
 - b. Sketch of the site showing the centre line. If a tidal river, show mean high and low water marks.

PRESENTATION

12. The details and measurements taken on site are presented in the form of a line profile drawn to scale (example at Annex D). The choice of scale will depend on the width and depth of the river, but generally it would be expected that the river will be wider than it is deep so to keep the profile in proportion the vertical scale would be greater than horizontal. The nature of the bottom, any changes or obstacles are also noted. A neat copy of the recce report proforma is also attached to the scale drawing.

13. For urgent operational requirements the details can also be presented on an Army Form 4012 A.

RIVER RECONNAISSANCE PROFORMA

Location Grid Reference Map Sheet

Description of Datum Point Grid Ref

Height of Datum above Water Level Metres

Direction of Current Speed of CurrentM/Sec

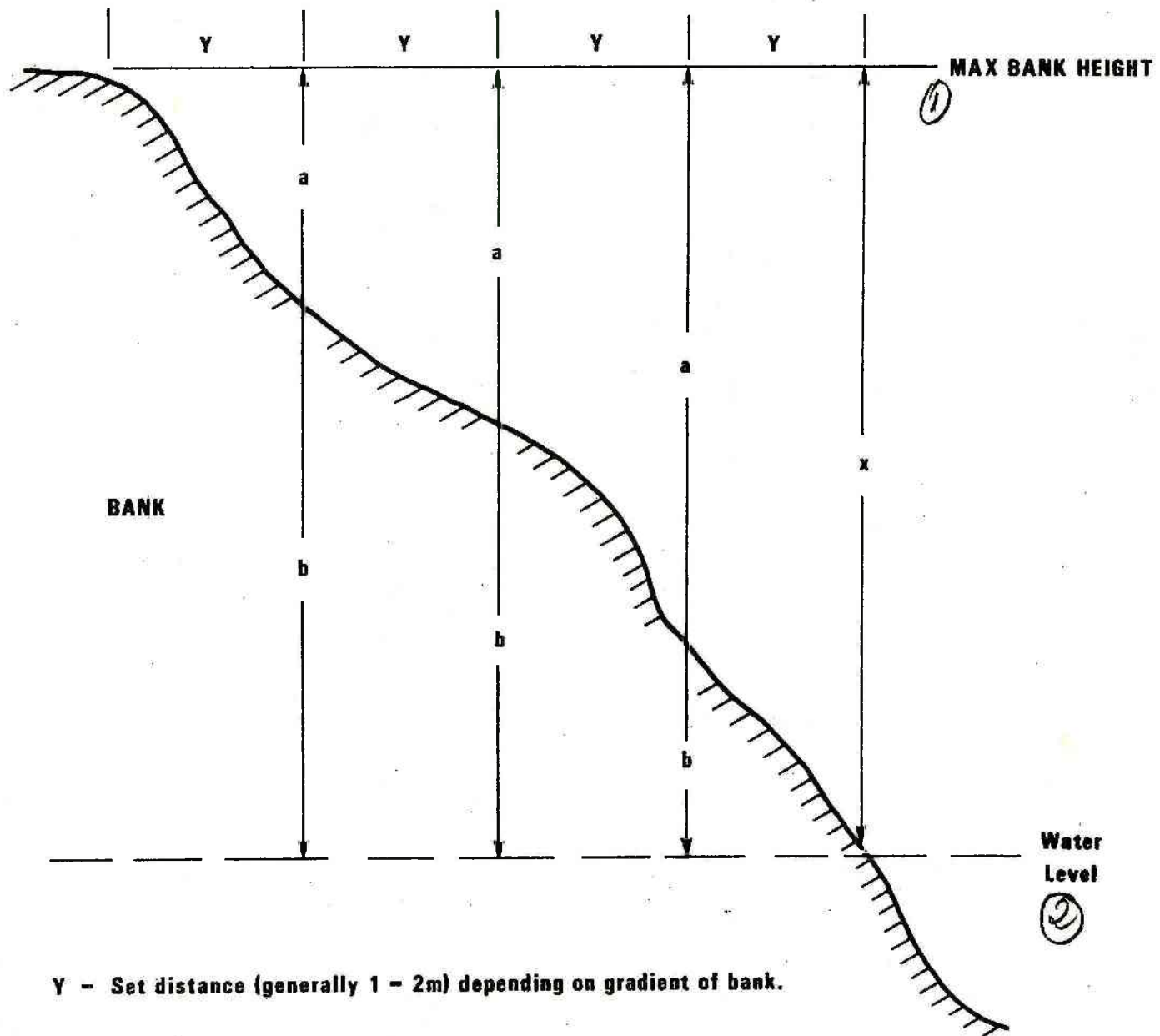
Direction of Recce Wet GapMetres

L/CUnit Date

Home Bank			Far Bank		
Max Bank Height			Max Bank Height		
Ground to Max Bank Height...	Bank Height		Ground to Max Bank Height :	Bank Height	
... metres back from water...			... metres back from water		
... " " " " " " " "		
... " " " " " " " "		
... " " " " " " " "		
... " " " " " " " "		
... " " " " " " " "		
... " " " " " " " "		

Dist Metres	Depth	Bottom Changes etc	Dist Metres	Depth	Bottom Changes etc

BANK HEIGHT DETAILS



Y - Set distance (generally 1 - 2m) depending on gradient of bank.

X - Max bank height - measure with Plumb Line and Tape.

a - Ground Level to max bank height.

b - Bank height, at that set distance from waters edge.

$$\therefore b = x - a$$

RIVER RECCE RECONOCIMIENTO EN EL RÍO

LOCATION: *Ubicación*

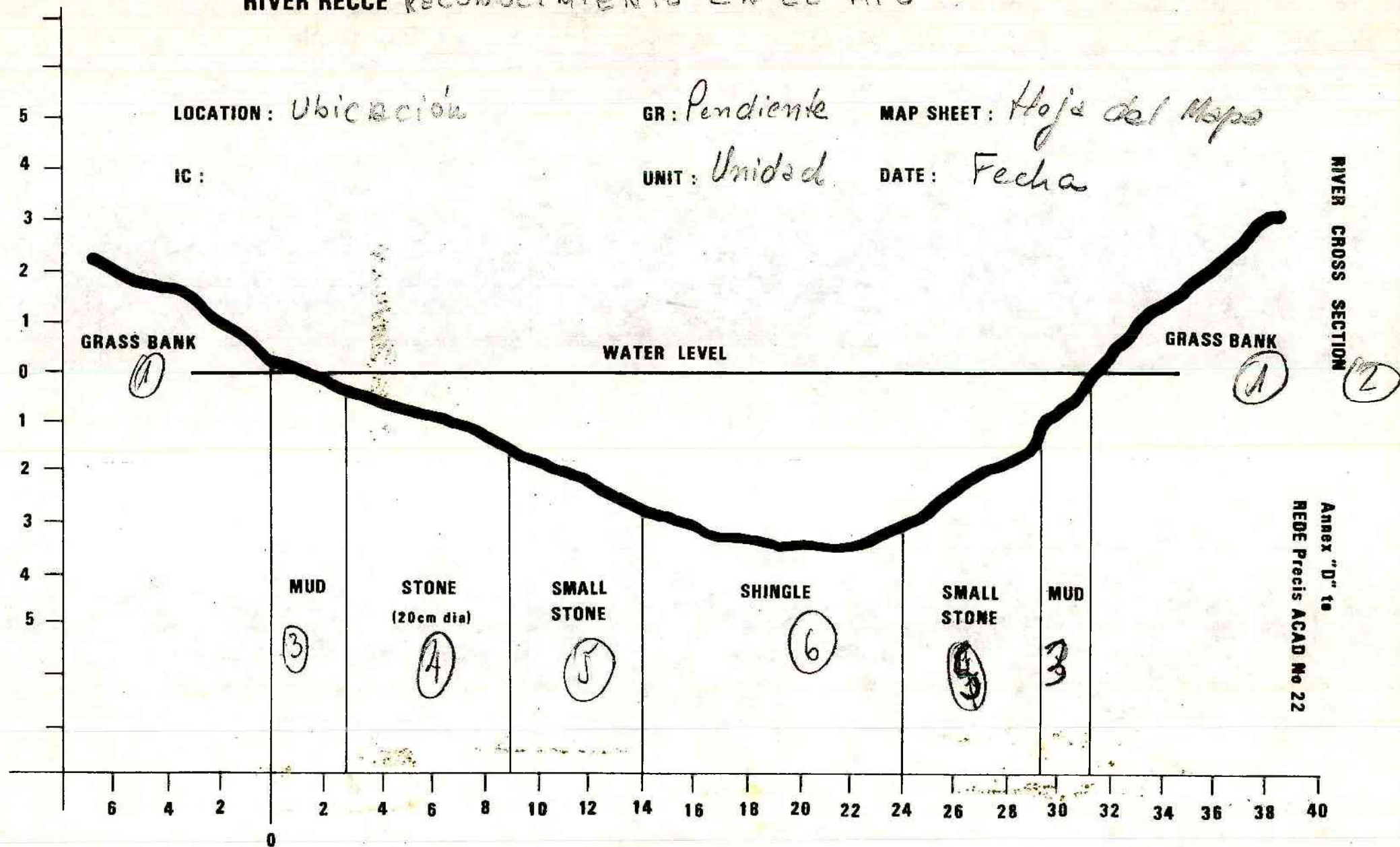
GR: *Pendiente*

MAP SHEET: *Hoja del Mapa*

IC:

UNIT: *Unidad*

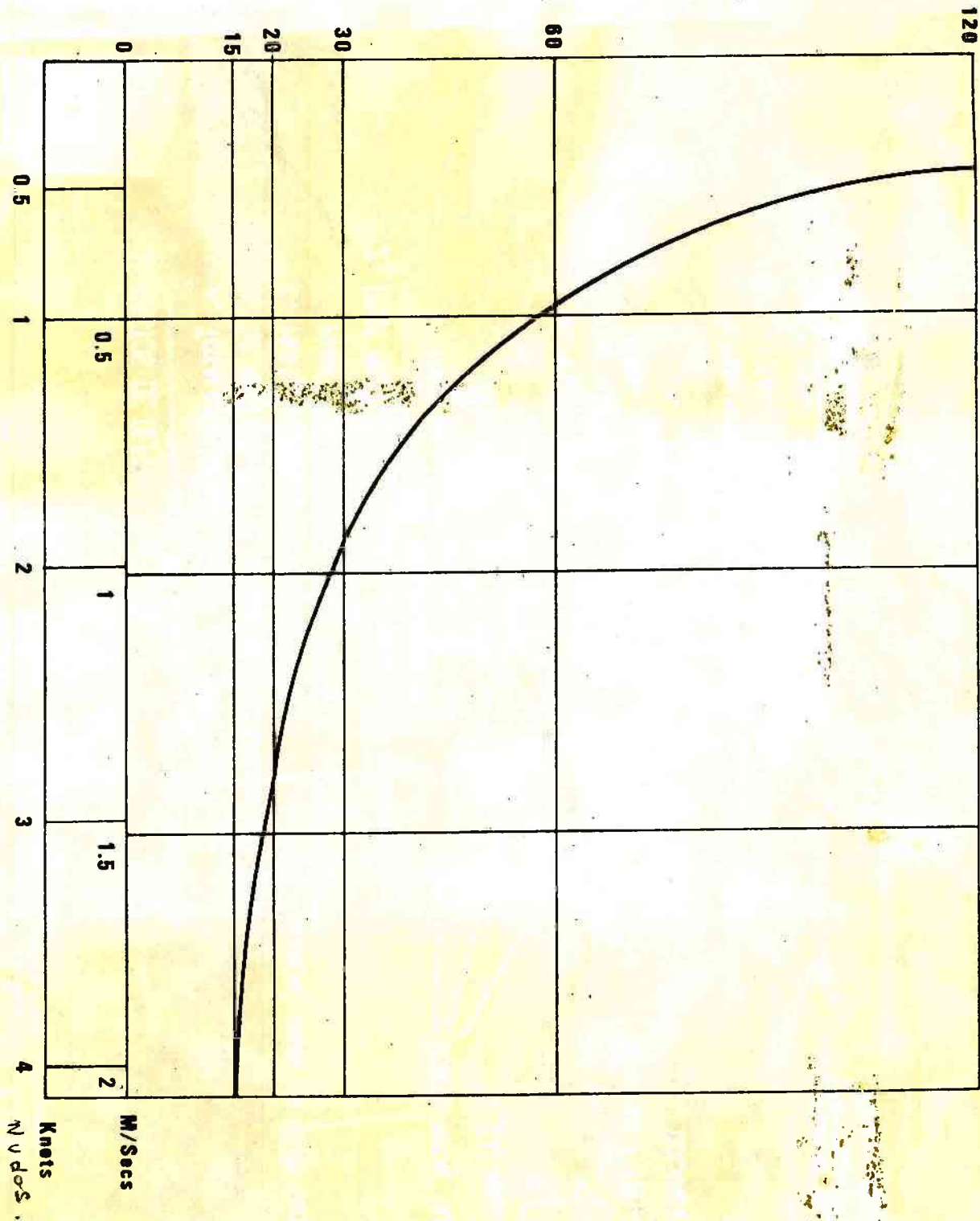
DATE: *Fecha*



Scale: 1 cm - 2 m

Annex "C" to
REBE Precis ACAD No 22

RIVER RECCE
CURRENT SPEED CHART
Reconocimiento del Rio
Carta de Velocidad
de la Corriente

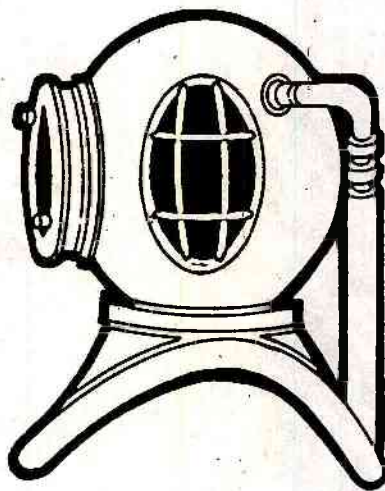


Speed of Current
Velocidad de la Corriente

Time for Float to cover 30m - Secs

Tempo de Flotacion

para cubrir 30 m - seg.



**HYDRAULIC UNDERWATER TOOL
POWER PACK**

HYDRAULIC UNDERWATER TOOL PACKAGE

REF: SPP/14/2000/7/78

General Description of Tool Package.

The package consists of a diesel driven hydraulic power pack with two tool circuits. Both circuits being variable in output and capable of being linked together to provide one high flow circuit.

Hydraulic Power Pack.

The power pack consists of a Lombardini 914, twin cylinder, air cooled, diesel engine fitted with a Lucas, Salami, Tandem hydraulic pump.

The Engine.

The engine is rated at 25 HP and is fitted with an electric start with a hand start provision. It has a 12V alternator for battery recharging which is driven by a belt which also drives a blower fan for engine cooling. It is mounted in a tubular steel frame.

Hydraulic Oil Tank.

The tank is 68 litres capacity, OM33 with integral suction filter, filler breather and contents gauge.

Engine Controls.

Engine controls are ignition switch, start button, hand throttle, stop lever and decompressor levers (for hand start only).

Engine Instruments.

Engine instruments are alternator warning light, oil pressure warning light, battery condition meter hours run clock. Additional battery isolator, external charging plug.

The Frame.

The frame is formed into a skid mounting. There is provision for fork lifting with hand lifting capabilities at the base. Sling points are welded at each corner and there are detachable wheel.

The Output.

The output varies with the driven speed from 1750 to 3000 RPM. A flow rate of between 19.8 LPM to 34 LPM per pump is possible. Inset in the flow lines are visual flow gauges. As hydraulic oil passes through these gauges an indicator moves against a scale allowing a visual reading of the flow to be made. These scales are graduated from 0-14 GPM and 0-60 LPM.

Flow From Pump 'B'.

It goes through gauge 'B' to outlet 'B'. The flow can be varied through this outlet by adjusting the hand throttle.

Flow From Pump 'A'.

It goes through the variable flow regulator control before reaching the gauge 'A'. The divider allows the flow to be reduced from maximum to zero by adjusting the control. The flow that is required is directed through gauge 'A' to outlet 'A' whilst the remainder is returned via the bypass to the tank.

The Flow Divider Control.

The control should normally be kept at maximum except when operating two tools with differing flow requirements. Always use circuit 'B' for undivided flow adding circuit 'A' for divided flow. When using undivided flow on circuit 'B' flow divider control should always be set a maximum.

Divertor Valve.

The divertor valve is inset in circuit 'B'. It enables the flow from pump 'B' to be linked with that of pump 'A' thus giving a single circuit flow of 39.6 litres/minutes to 68 litres/minute for tools in that range. Set in this position only circuit 'A' can be operated. When using this circuit the flow divider control should be a Max and flow adjusted via the hand throttle.

Circuit On/Off Controls.

These are located on both outlets, in position bypass with engine running. They allow flow rate to be read without flow going through hoses to the tool but straight back to the tank. Also in this position they allow individual tools to be changed. In position run oil is passed through the hoses to the tools.

Relief Valve.

A relief valve is set between the hydraulic oil tank and the two outlet ports of the pumps. It is set to crack the main valve at maximum operating pressure of 2000 PSI.

The System Pressures.

To test circuit pressure proceed as follows:

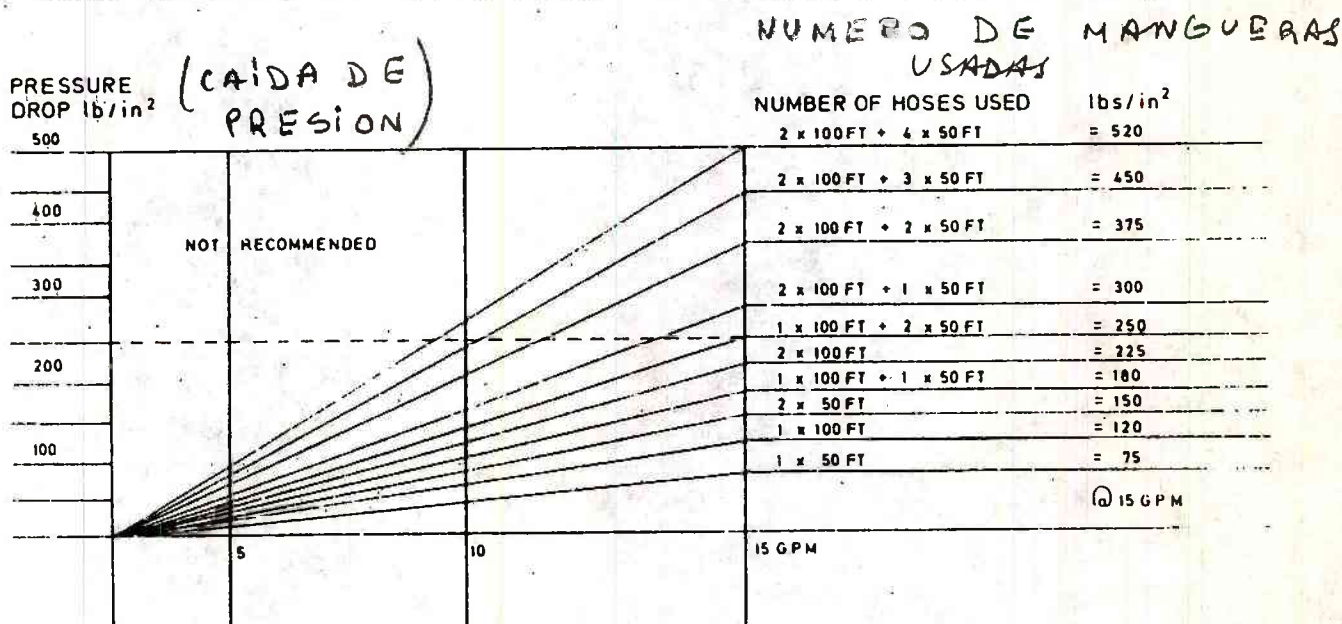
- a. Start engine.
- b. Set throttle at Min.
- c. Move circuit 'A' valve to run position.
- d. Move circuit 'A' test valve to test position, (test pressure should read 2000 PSI).
- e. Move circuit 'A' test valve to run position.
- f. Move circuit 'A' valve to by-pass position.
- g. Repeat procedure for circuit 'B'.

Hydraulic Hoses.

The hydraulic supply hoses are made up in two lengths 100ft and 50ft. A delivery hose of $\frac{3}{8}$ " internal bore and a return hose of $\frac{1}{4}$ " internal bore. The ends of the hoses are fitted with screw lock couplers. The ends are also colour coded to avoid the possibility of incorrect coupling up. If the hoses are incorrectly coupled, ie large dia to flow and small dia to return, this will result in excess back pressure on the tooling with consequent loss of power, ie 'Red' is flow, 'Blue' is return. Each package is supplied with two 100' twin hoses and four 50' twin hoses giving a length capability of 200' per side. Always use the shortest hose run possible. If work is to be carried out within 50' of the power pack do not fit the larger hose and have the extra coiled around on the deck similarly if the work is within 100' use the 100' hose and not two 50' joined. If work is in excess of 200' of pack it is in order to couple 2 x 100' plus 1 x 50'. This should only be used on high output.

Pressure Drop.

A pressure drop will be experienced through the hoses and tool the more lengths of hose there are between the power pack and the tool. The graph below represents the typical pressure drop that will be experienced through hoses and couplings. It shows the advantage of selecting the correct hose lengths, ie, 2 hoses of 50', incur a greater pressure drop than 1 of 100'.

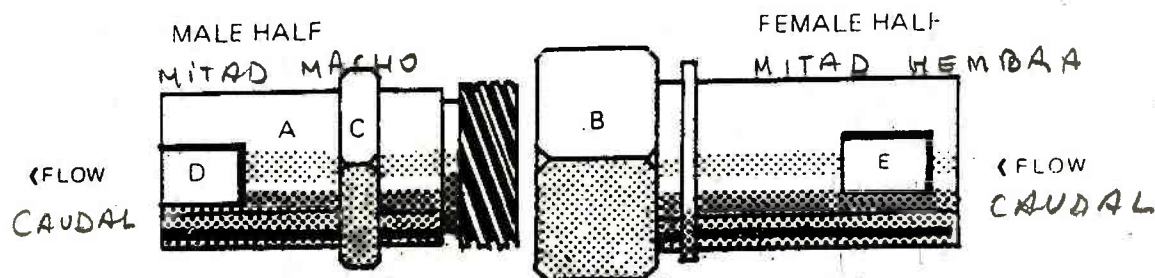


PRESSURE DROP GRAPH

GRÁFICO DE LA CAIDA DE
PRESION.

Self Sealing Couplings.

To connect: with a suitable spanner hold male coupler Half A at Hexagon C or Flat D, screw Hexagon nut B of female coupler fully onto body of male coupler in clockwise direction. Female coupler may be held at Flat E to avoid hose twisting.



Section 7 HYDRAULIC HOSES. Part No's ECH/2000/100, ECH/2000/50.
Part No's 0848/867-0041, 0848/867-0042

MANGUERAS HIDRAULICAS.

Hoses.

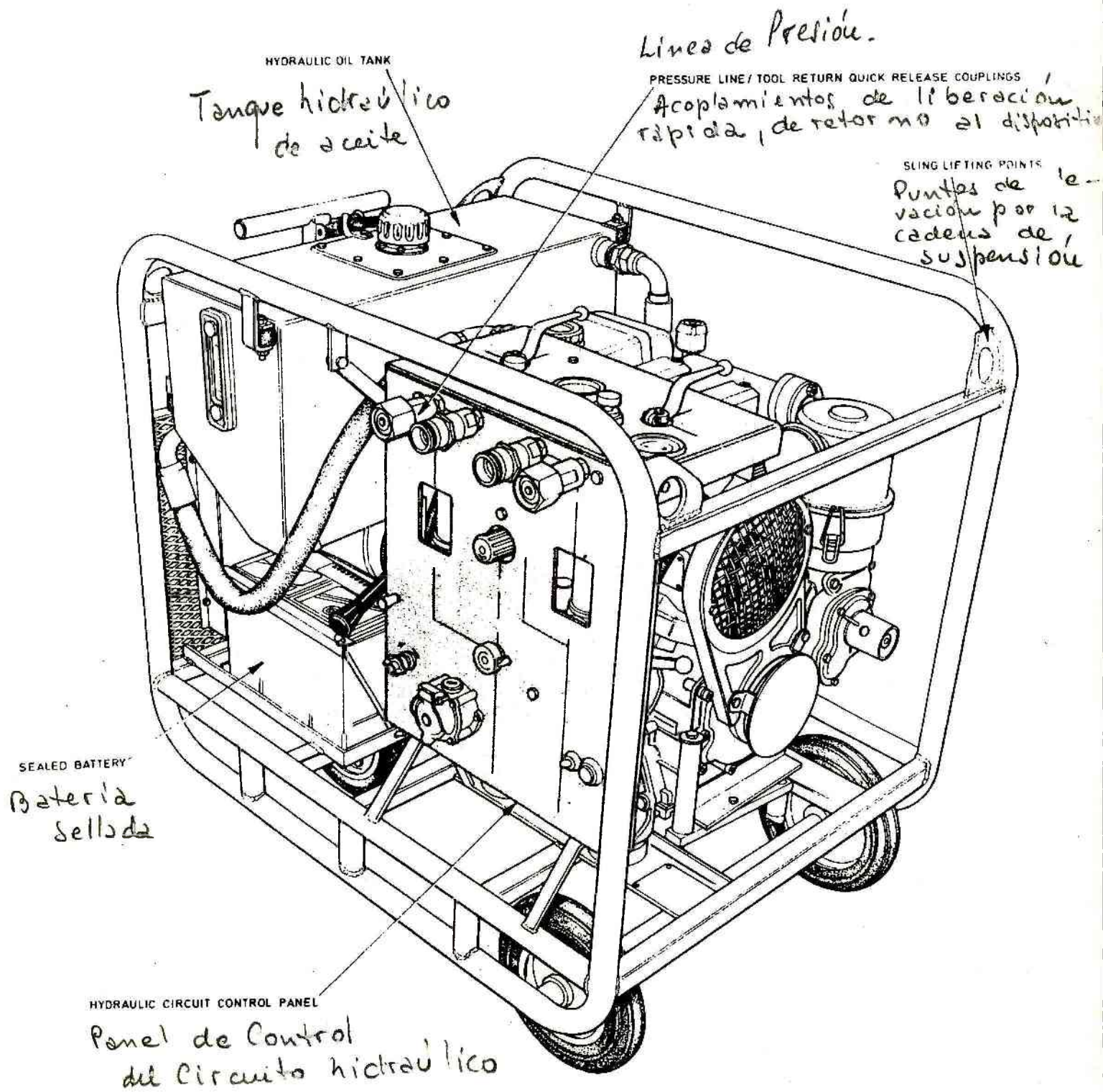
The hoses should be cleaned and stored either in flat coil or figure of eight, taking care not to flatten, kink or abrade them. Bends must be kept to a minimum radius of 2', if possible they should be stored away from direct sunlight and salt atmosphere.

After Use.

Hoses and tools should be washed off in fresh water, dried thoroughly. The hoses powdered with french chalk. The tools lightly oiled all over with OMD 75.

SOME DON'TS

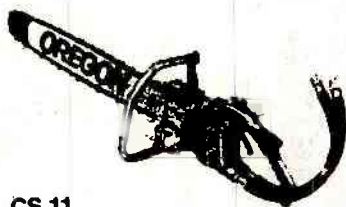
- NEVER - Stop the engine by the decompressor lever it will damage the valves.
- NEVER - Allow the engine to run out of fuel (the system will have to be bled).
- NEVER - Turn off the battery isolator switch or disconnect the battery whilst the engine is running, it will damage the alternator.



HERRAMIENTAS

SUBMARINAS

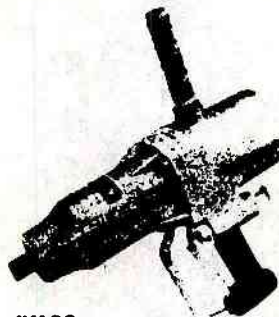
UNDERWATER TOOLS



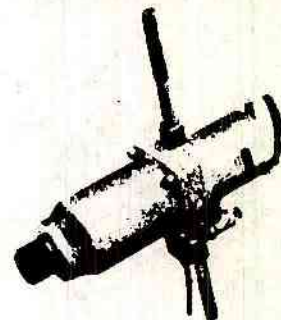
CS 11



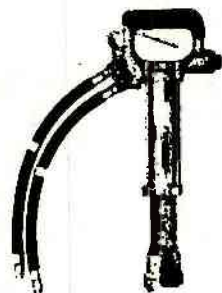
GR 24



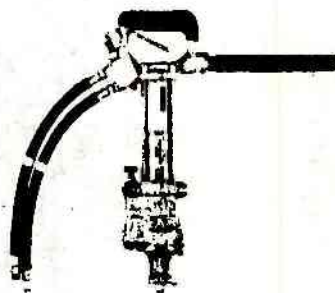
IW 22



IW 32



CH 18



HD 20



IW 23



SC 10



CO 08



IW 06



CO 23



IW 13



CO 24



DL 22



IW 20

SPECIFICATIONS

DETALLES

MODEL	CS11	CH18	CO08	CO23
Capacity	24", 30", 36", 43" bar lengths	2-1/2" shank x .580 hex	8" wheel	10" wheel
Weight	14 lbs./6 kg.	24 lbs./10.9 kg.	16 lbs./7 kg.	23 lbs./10.5 kg.
Length	17 in./43 cm.	20 in./50.8 cm.	26 in./64 cm.	19.5 in./49.5 cm.
Width	9 in./23 cm.	3 in./7.6 cm.	6.5 in./16.5 cm.	11 in./28 cm.
Pressure	1500-2000 psi 105-140 bar	1500-2000 psi 105-140 bar	1000-2000 psi 70-140 bar	1500-2000 psi 105-140 bar
Flow Range	10-14 gpm 38-53 lpm	7-9 gpm 26-34 lpm	7-9 gpm 26-34 lpm	10-15 gpm 38-57 lpm
Optimum Flow	14 gpm 53 lpm	8 gpm 30 lpm	8 gpm 30 lpm	15 gpm 57 lpm
Porting	1/2 SAE	3/8 SAE	3/8 NPT	1/2 SAE
Hose Whips	Yes	Yes	No	Yes
Connect Size and Type	1/2 male pipe hose end	3/8 male pipe hose end	3/8 NPT in handle	1/2 male pipe hose end
Hyrevz Motor	03272		02979	integral

Modelo
Capacidad
Peso
Longitud
Ancho
Presión

Caudal
Caudal
Optimo
Salida

Conexión
de manguera

Conexión
Tamaño y Tipo

TOOL RANGE

ALCANCE DE LAS HERRAMIENTAS.

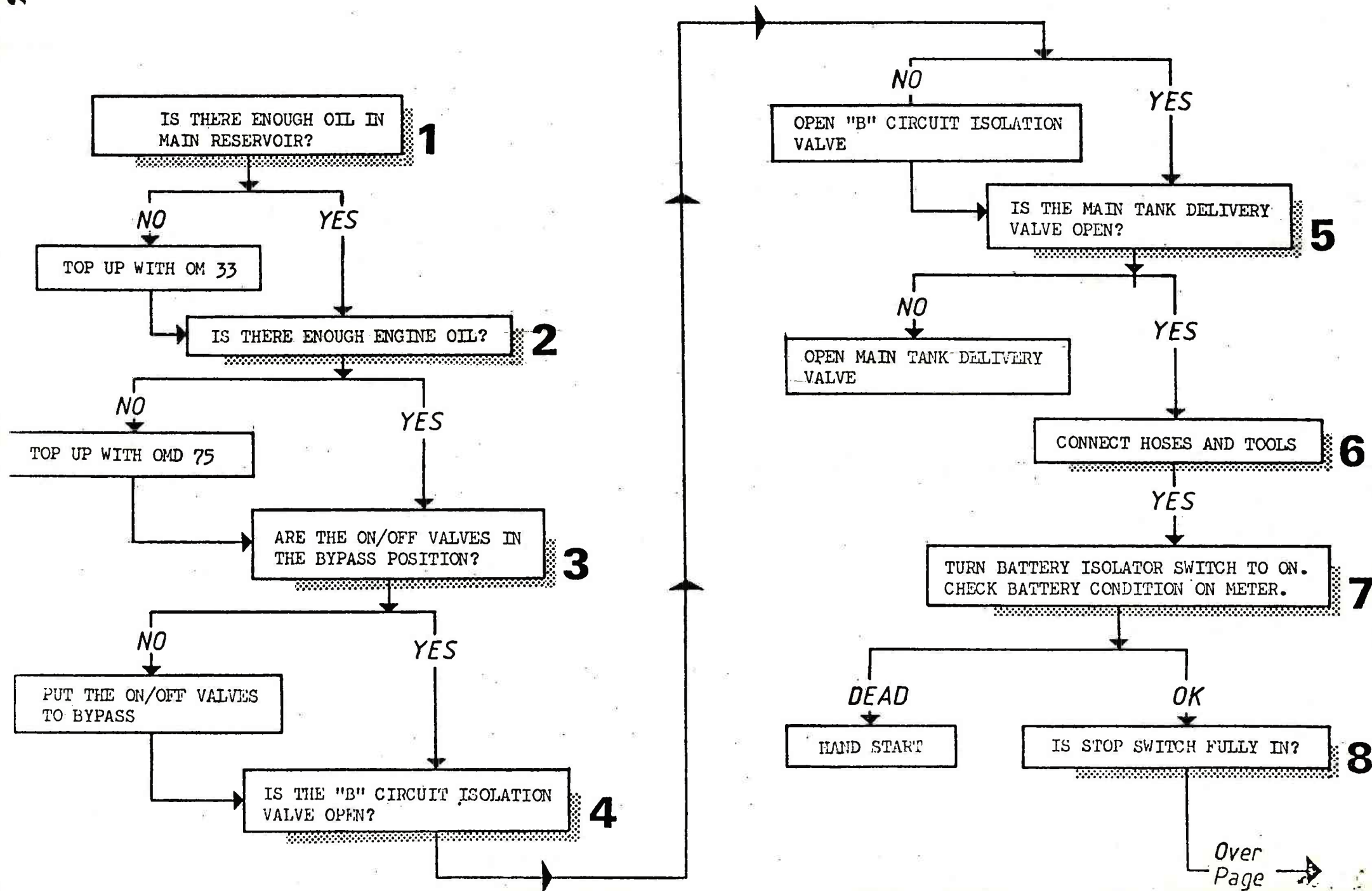
MODEL	IN 06	IN 22	GR 24	CO 24	CO 08
DESCRIPTION DESCRIPCION	Llave de impacto Impact Wrench and Drill $\frac{3}{8}$ " Hex 1/C Taladro	Llave de impacto y Impact Wrench 1" Square Drive Propulsion cuadrática	Amoladora angular y Angle Grinder and Cut Off Unit Unidad de corte	Horizontal Cut Off Unit Unidad de corte Horizontal	Vertical Cut Off Unit Unidad de corte vertical
OPTIMUM FLOW CAUDAL OPTIMO	20 LPM	30 LPM	34 LPM	30 LPM	30 LPM
WEIGHT PESO	4.5 kg	12 kg	5 kg	5 kg	7 kg
PRESSURE RANGE ALCANCE PRESION	70 - 140 kg/cm ²	70 - 140 kg/cm ²	70 - 140 kg/cm ²	70 - 140 kg/cm ²	70 - 140 kg/cm ²
LENGTH LONGITUD	29 cm	40 cm	35.6 cm	35 cm	64 cm
WIDTH ANCHO	8.6 cm				16.5 cm
USE ON SURFACE USO SOBRE LA SUPERFICIE	YES (Si)	YES (Si)	MAX of 3 mins	MAX of 3 mins	YES
USES USOS	① Wood drilling and impacting nuts and bolts	② Heavy duty nut running	③ Grinding, cutting fouled ropes, brush scrubbing	④ Heavy duty cutting and scrubbing	⑤ Vertical cutting of cables and for straight entry
SPECIAL INSTRUCTIONS INSTRUCCIONES ESPECIALES	⑥ Do not operate the reversing spool with trigger pressed, motor running when using for impacting nuts and bolts. Do not allow to impact for more than 10-15 secs at a time. Do not use excess grease. Do not use excess flow through tool.	⑦ Do not operate the reversing spool with trigger pressed motor running. Do not allow to impact for more than 10-15 secs at a time. Do not use excess grease. Do not use excess flow through tool.	⑧ Do not exceed optimum flow for this tool. Do not overtighten wheels.	⑨ Do not exceed optimum flow for this tool. Do not overtighten wheels.	⑩ Do not exceed optimum flow for this tool. Do not overtighten wheels.

IF OPTIMUM FLOW IS EXCEEDED IN THESE TOOLS WHEEL
SPEEDS IN EXCESS OF MANUFACTURERS SAFETY
RECOMMENDATIONS WILL BE ACHIEVED CAUSING WHEEL
TO SHATTER WITH POSSIBLE FATAL RESULTS. ⑪

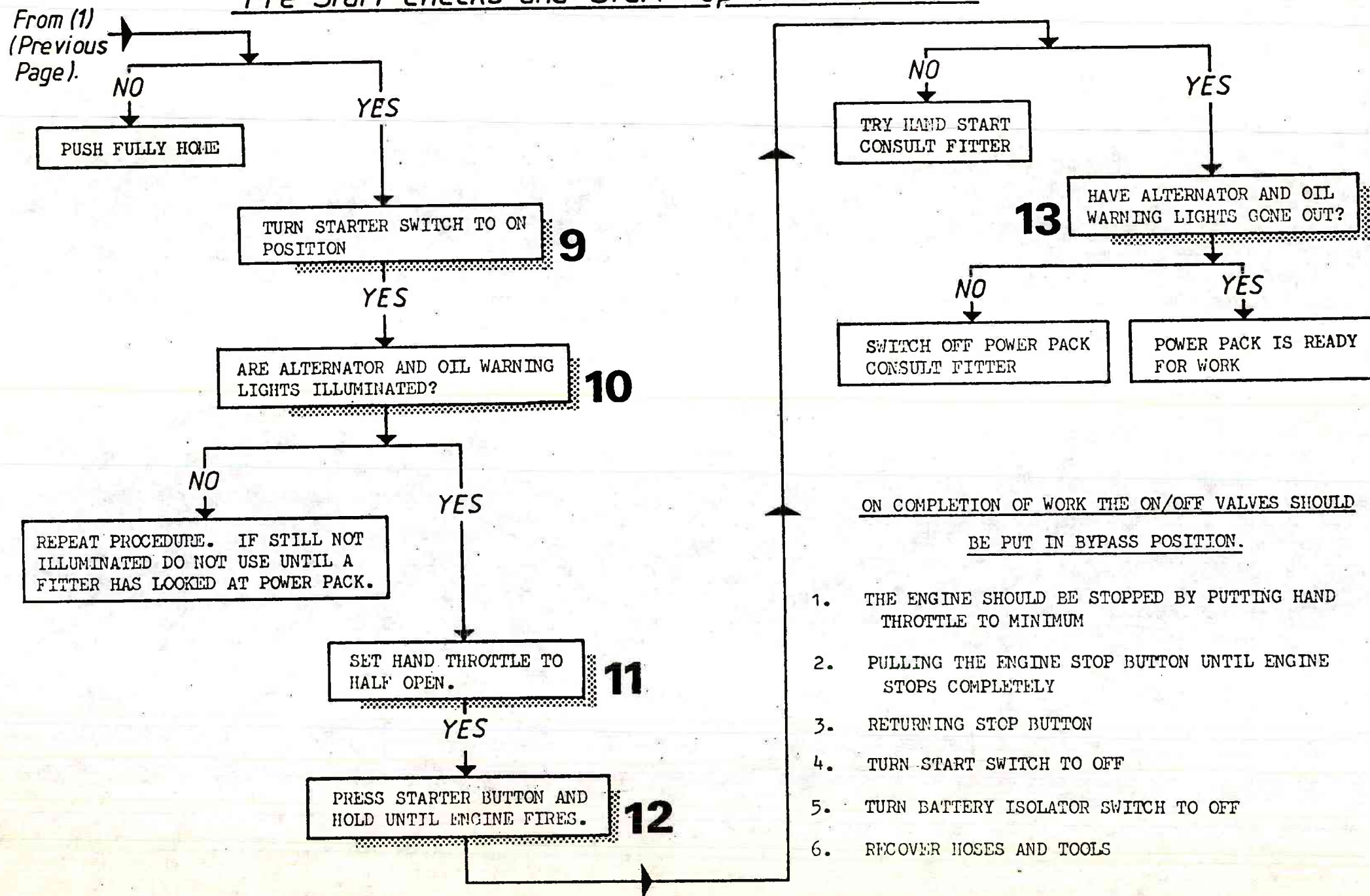
Gráfico B

MODEL	CS 07	CS 17	HD 20	BR 67	BR 85	CH 18	SM 22
DESCRIPTION	Light weight chain saw	Heavy Duty Chain Saw	Hammer Drill	Medium Class Concrete Breaker	Heavy Class Concrete Breaker	Chipping Hammer	Submersible Water Pump
DESCRIPTION	①	②	③	④	⑤	⑥	⑦
OPTIMUM FLOW CAUDAL OPTIMO	30 LPM	54 LPM	30 LPM	30 LPM	30 LPM	30 LPM	38 LPM
WEIGHT PESO	4 kg	6.3 kg	12.7 kg	30 kg	38 kg	10.9 kg	13.6 kg
PRESSURE RANGE ALCANCE DE PRESION	70-140 kg/cm ²	70-140 kg/cm ²	126.6 kg - 154.7 kg cm ²	105-140 BAR	70-140 kg/cm ²	105-5-140.6 kg/cm ²	70.3-140.6 kg/cm ²
LENGTH LONGITUD	38 cm	43 cm	53.3 cm	68 cm	74 cm	50.8 cm	34.6 cm
WIDTH ANCHO	22 cm	23 cm	12.7 cm	40 cm			29.8 cm
USE EN LA USE ON SURFACE SUPERFICIE	YES	YES	YES	YES	YES	YES	NO
USES USOS.	Cutting Wood ⑧	Heavy duty wood cutting ⑨	For drilling holes in concrete or masonry ⑩	Medium rock breaking applications ⑪	Heavy duty rock breaking ⑫	Chipping scaling light demolition ⑬	Pumping water and sediment up to 3" solids ⑭

Pre Start Checks and Start-Up Procedure. (1).



Pre Start Checks and Start-Up Procedure. (2).



Schedule of Servicing Engine.

Daily

①
EVERY 8 HOURS REMOVE AIR FILTER ELEMENT
WASH IN PARAFFIN, DRY OUT WITH AIR AND
REPLACE. CHECK AIR FILTER OIL LEVEL.

CHECK CRANKCASE OIL LEVEL
TOP UP WITH OMD 75 ②

100 Hrs

③
DRAIN CRANKCASE OIL AND REFILL WITH 2.8 LTRS OMD 75.
CHECK BLOWER BELT TENSION. IF MORE THAN ONE CENTIMETRE
REMOVE SPACER BETWEEN DRIVEN PULLEY FACES. SET ASIDE
SAFELY.

50 Hrs

④
CHECK BLOWER BELT TENSION. CLEAN OUT AIR
FILTER BOWL AND REFILL WITH OMD 75

300 Hrs

⑤
REPLACE FUEL FILTER ELEMENT IN BASE OF
FUEL TANK. REPLACE CRANKCASE OIL FILTER
ELEMENT.

500 Hrs

⑥
REMOVE BLOWER TOP COVER. CLEAN COOLING FINS.
REMOVE FUEL PUMP TOP COVER. CLEAN FILTER
SCREEN. CLEAN AND CALIBRATE INJECTORS.
FIT NEW BLOWER DRIVE BELT. (REPLACE SPACER
IF REMOVED)

5000 Hrs

⑦
COMPLETE ENGINE OVERHAUL

3000 Hrs

⑧
ENGINE TOP OVERHAUL

1000 Hrs ⑨

REMOVE SUMP. CLEAN OUT OIL PUMP STRAINER
SCREEN. CLEAN OUT FUEL TANK. CHECK AND
ADJUST VALVE CLEARANCES.

ELECTRICS: PERIODICALLY CHECK CONDITION OF WIRING AND CONNECTIONS

⑩

ENGINE CRANK CASE	:	2.8 LITRES
ENGINE AIR CLEANER	:	0.3 LITRE
ENGINE FUEL TANK	:	10.0 LITRES

Schedule of Servicing - Hydraulic System.

MAKE VISUAL INSPECTION OF ALL
PIPE JOINTS AND UNIONS.
CHECK MAIN RESERVOIR.
TOP UP WITH OM 33 IF NECESSARY.

Daily.

LUBRICATE ALL HINGE POINTS
AND CONTROL JOINTS.

Weekly.

DRAIN MAIN HYDRAULIC RESERVOIR.
REFILL WITH OM 33.
CHANGE PRESSURE LINE FILTER ELEMENTS
BY UNSCREWING FILTER BOWLS.
FIRST ENSURE THAT TANK DELIVERY VALVE
IS CLOSED. DO NOT FORGET TO REOPEN
VALVE ON COMPLETION OF OPERATION.
REFIT LOCKING COLLAR.

6 Monthly

CHANGE SUCTION FILTER ELEMENT. THIS IS
DONE VIA THE ORIFICE IN THE TANK TOP
AFTER REMOVING FILLER BREATHER AND FILTER
SCREEN AND DRAINING MAIN RESERVOIR.

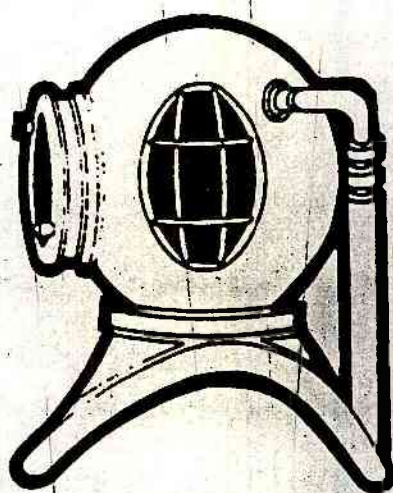
Annually.

68



7

REDE PRECIS No 26
Ice Diving
Nov 83



DIVING THROUGH ICE

DIVING THROUGH ICE

GENERAL

1. Ice diving is a dangerous practice and is generally not to be encouraged unless absolutely necessary. .

2. HAZARDS

a. Cold Stress The 'Cold Shock' effect occurs immediately the diver enters the water. The body temperature regulating mechanism will at first attempt to warm up the extremities by increased blood flow. As the heat sink effect chills the diver vaso-constriction takes place at the extremities and these areas will become much colder as the body attempts to preserve core temperature. The effects are:

- (1) Loss of manual dexterity.
- (2) Loss of hand-eye co-ordination.
- (3) Reduced decision-making ability.

b. Hypothermia The diver will become hypothermic after prolonged exposure to cold water.

c. Frostbite As skin temperature drops below 10°C all sense of touch is lost. Prolonged periods of skin temperatures of 10°C or less will halt circulation and cause frostbite. The diver must be adequately clothed, ie there should be no exposed areas of skin. Alcohol and nicotine are both likely to restrict circulation and increase the possibility of frostbite.

d. Snow blindness If working on ice for prolonged periods, support personnel are subjected to high doses of Ultra Violet Radiation. Eye protection must be worn to prevent snow blindness.

PREPARATION

3. Personnel All personnel proposing to undertake ice dives must be physically fit, and trained in ice-diving techniques. Psychological stress is high when diving under ice, and the dive supervisor must disbar any diver he considers to be unsuitable. Previous evidence of anxiety, recklessness or claustrophobia should preclude.

4. The divers and attendants must be familiar with the lifeline signal table. (Annex A).

5. Equipment

a. Demand Valves Regulator freeze up must always be prevented:

- (1) Keep the regulaor warm before diving.
- (2) Test the regulator in a warm environment before diving, then refrain from using it again until underwater.
- (3) If the diver surfaces during the dive the regulator MUST remain underwater.

(4) The regulator must be fully servicable and well balanced. Free flow at Depth can cause freeze up.

b. Lifelines

- (1) The diver is always to be attended on a lifeline; attached around the chest (under the ABLJ) using a bowline and two half-hitches.
- (2) The lifeline is to be marked at 3m intervals along its length.
- (3) The lifeline should be at least 11mm diameter nylon or polyprop.

c. Attendant The attendant is to maintain his hold on the lifeline at all times.

(1) The inboard end of the lifeline is to be secured to a stationary object/anchor. If no other anchor is available, an ice anchor is to be constructed.

(2) Ice Anchors A 200 x 200mm square timber of 1m minimum length is to be used. The inboard end of the lifeline is to be secured to the timber using a timber hitch and two half hitches. The anchor is inserted through a 200mm x 200mm hole drilled in the ice.

d. Communications The standard lifeline signals table shown in Annex A is to be used.

e. Diver Lights A diver distress or marker light must be worn and activated as soon as the diver enters the water in order that he may be easily located in an emergency.

ICE HOLES

6. General The surface support team and supervisor must stand on a suitable platform which will float if the ice breaks (eg inflatable dinghy).

7. Cutting The hole is to be cut with an ice saw or chain saw to leave a clean edge. Breaking through with a sledgehammer will weaken the surrounding ice and is not recommended. The hole may be either:

a. Rectangular 2m x 1m

b. Triangular 2m sides

8. The triangular hole is easier to cut and provides a better exit for the diver.

9. The hole must be large enough to allow two divers to make a simultaneous exit in an emergency.

10. Slush and ice must be removed from the hole, not pushed under the surface where it may later slip back and block the hole.

11. Sandbags or tarpaulins should be placed on the ice around the hole to assist the diver exiting and improve the footing for the surface support crew.

The location of the hole must be clearly marked at the conclusion of the dive to prevent anyone from falling through.

12. Escape Holes When diving in a river an escape hole or holes must be cut downstream, and would normally only be used during the lost diver drill (below).

SHELTER

13. In order to reduce the dangers of frostbite and equipment freeze-up some shelter must be provided around/near the hole.

14. Tents A heater shelter must be available near the entry hole to protect the divers and support crew. 9 x 12 tents and space heaters are ideal. Warm, dry clothing, hot beverages etc should be available for divers on completion of the dive.

15. Windbreak It is advisable to provide a windbreak round the hole.

DIVERS DRESS

16. The dangers of hypothermia/frostbite are greatly reduced if a well fitting dry-suit is worn. However, if vent valves are fitted these may be prone to freeze up.

DIVE PROCEDURES

17. Divers may operate singly or in water of visibility greater than 2m, in pairs.

18. Buddy System Each diver must be connected to the lifeline, not merely to the other diver. It is recommended that a 'Y' line is used, allowing the divers to be no more than 2m apart; the arms of the 'Y' must be joined with an eyesplice of a length not less than 3 times the circumference of the lifeline.

19. Attendant The attendant is to report the distance to the diver by reference to the lifeline marks.

20. Standby Diver A standby diver is to be nominated for every dive. He is to be available at immediate notice:

- a. Diver fully dressed with set on and cylinder valve open.
- b. Lifeline attached and secured to an anchor.
- c. Standby divers attendant nominated and on site at all times.

21. Before the dive commences the standby diver is to be fully dressed and his set checked for leaks while underwater. He should descend to 10m to confirm that he can clear his ears.

EMERGENCY PROCIDURES

22. Lost Diver Drill If for any reason the diver loses his buddy line and cannot locate the entrance hole he must:

- a. Slip weights.
- b. Ascend to the ice.
- c. Fix the point of his knife into the ice.
- d. Hang vertically from the ice, stretched down to maximum length and exercise control over his respiration to conserve air.
- e. Wait for the standby diver to arrive.
- f. DO NOT ATTEMPT TO RELOCATE THE ENTRY OR EXIT HOLES
DO NOT PANIC
CONSERVE AIR

Search Drill

23. The standby diver is to be equipped with a lifeline TWICE the length of that used by the divers.

24. In the event that contact is lost with a diver:-

- a. All other divers are to be recalled IMMEDIATELY.
- b. The Supervisor must estimate the most likely location of the lost diver by assessing his known speed and direction of travel.
- c. The standby diver is to enter the water and swim in the direction indicated by the Supervisor a distance equal to twice that covered by the lost diver.
- d. The lifeline is to be kept taut by the attendant.
- e. The standby diver is to carry out a circular sweep just below the layer of ice.
- f. When his lifeline snags on the diver in trouble, he is to swim in to the lost diver, signalling the attendant to take up slack as he moves (4 bells).
- g. The lost diver is then assisted to the exit hole.
- h. If the first sweep fails it should be repeated ONCE before recalling the standby diver and moving the search to the Emergency Exit hole.

BUDDYLINE SIGNALS

1. Communication between a pair of divers underwater is by the single-lifeline code of signals on the buddyline.
2. This code may be supplemented by special pre-arranged signals, but to avoid confusion these should be kept to a minimum.
3. A diver requiring help from his companion in an emergency gives the emergency signal - a rapid succession of pulls.

SINGLE LIFELINE CODE

Attendant to Diver

General Signals:

1 pull	To call attention
	Are you well?
2 pulls	Am sending down a rop's end (or as pre-arranged)
3 pulls	You have come up too far
	Go down slowly till we stop you
4 pulls	Come up
4 pulls followed by 2 bells	Come up, surface decompression
4 pulls followed by 5 bells	Come up your safety float

Direction Signals:

1 pull	Search where you are
2 bells	Go to the end of distance line or jackstay
3 bells	Face shot then go right
4 bells	Face shot then go left
5 bells	Come into your shot, or turn back if on a jackstay

Diver to Attendant

General Signals:

1 pull	To call attention
	Made bottom
	Left bottom
	Reached end of jackstay
	I am well
2 pulls	Send me down a rope's end (or as pre-arranged)
3 pulls	I am going down
4 pulls	May I come up?
4 pulls followed by 2 bells	I want to come up. Assist me up
4 pulls followed by 5 bells	May I come up on my safety float?
Succession of pulls (must be more than 4)	EMERGENCY SIGNAL. Pull me up IMMEDIATELY
Succession of 2 bells	Am fouled and need the assistance of another diver.

Succession of 3 bells
4 pulls followed by 4 bells

Am fould but can clear myself if left alone
Attend telephone/DUCS

Working Signals:

1 pull
2 bells
3 bells
4 bells
5 bells

Hold on or stop
Pull up
Lower
Take up slack lifeline, or
You are holding me too tight
Have found, started, or completed work

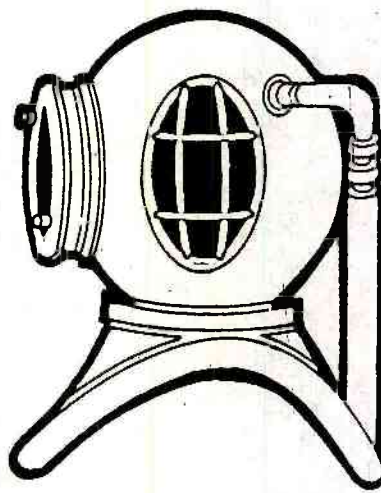
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REDE PRECIS

ACAD No28

Jul 84



MINE WARFARE

**UNDERWATER EMPLACEMENT • DETECTION
AND CLEARANCE : BRITISH MINES**

RESTRICTED

MINE WARFARE
UNDERWATER EMPLACEMENT, DETECTION AND CLEARANCE
BRITISH MINES

Reference:

- A. ME Vol 2 Pam 6 Detection and Clearance of Mines and Explosive Devices

GENERAL

1. There is a requirement to lay, record and breach mines underwater at crossing sites as part of the commanders defensive plan. This may be either:
 - a. An element of a Tactical Minefield, or
 - b. A hastily laid delaying obstacle.
2. Aim This precis describes an effective and proven method of laying, detecting and clearing NATO Anti Tank Mines underwater, in currents up to 1.5m/s and to 2m depth of water.
3. The Mk 7 A/TK and Barmine will create an effective anti-vehicle barrier at Amphibious crossing sites/fords when deployed from the riverline down to 2m depth where they are most effective against entering or exiting amphibious vehicles.
4. The underwater mine barrier should be supplemented by both AP and A/TK mines above water level at the entry/exit sites. If laid as an element of the tactical minefield the crossing site is to be considered as an area of nuisance mining, and should be completed before the tactical minefield is started.

SAFETY PRECAUTIONS

5. All safety precautions listed in Ref A applicable to the handling of mines are to be strictly observed. In addition the supervisor is to pay particular attention to the following points:
 - a. No anti-handling devices are to be fitted during laying.
 - b. No tilt fuses are to be fitted.
 - c. In training dummy mines must always be treated as live, and dummy mines are not to be mixed with live mines.
 - d. A minimum number of men are to enter the water at any one time.
 - e. Entry to the minefield is always to be via established distance lines from a cleared area.

MINE ARMING

6. Fuzes Mk 7 anti-tank mines and Barmines are to be hand laid with fuzes as follows:
 - a. Mk 7 A/TK - Double impulse fuzes
 - b. Barmines - Single impulse

7. Tilt Fuses Tilt fuses are not to be used.
8. Barmine The Barmine is carried unarmed by the diver, then armed after anchoring in position.
9. Mk 7 Mines are prepared on the surface and armed for double impulse detonation. They are carried armed.
10. Anchoring Both types of mine are always to be anchored in position with a grillage plate. -
 - a. To ensure that the mines do not 'migrate' on the bed, and,
 - b. To act as a 'Spreader' in soft river beds to improve the chances of detonation.
11. Anchoring must always be carried out as described in this precis, even when no current is detected at the time the mines are laid.
12. Grillage plates are to be prepared from XPM as shown in Annex A. The mines are wired or tied in position using a non biodegradable cordage (nylon or polypropylene). Each grillage is to be anchored in position with a 15mm diameter pin as illustrated in Annex A. To prevent the pins being lost during the dive they should be secured to the grillage with a 1m length of light nylon line.
13. Minefield Density The smallest useful underwater minefield which can be laid in accordance with current regulations for safe distances between mines and mine rows is a 2 row panel 30m in length.
14. This density will deny to the enemy a single 'green' crossing point on a river in BAOR. Larger areas may be denied by increasing the overall length (E) of the minefield.

METHOD

15. Command and Control All members of the team are to be thoroughly briefed as to their responsibilities. The Supervisor is to ensure that they adhere strictly to the drills laid down in this precis.
16. Manpower The laying party must consist of a minimum of 4, including a Diving Supervisor, Diver and Standby Diver. The efficiency of the party is greatly increased if a team of 5 is available to carry out the following tasks:

i/c Supervisor	ADS/UDS Recorder, pacing out and supervisor
No 1	Diver
No 2	Divers attendant
No 3	2 i/c/Standby diver
No 4	Mine armer. No 1 in setting out party. Deliver mine to diver.
17. Combining Tasks A minimum of 4 personnel can carry out the task, though at a reduced level of efficiency, if duties are combined as follows:

i/c Supervisor	ADS/UDS Recorder
No 1	Diver
No 2	Divers attendant
No 3	Standby diver/mine armer and delivery of mine
18. Diver The diver is to be dressed as follows, vented and checked for leaks before minelaying commences:

UWSS, Hood & fins
 Aquarius DSCCABA
 Lifeline

Gloves worn at supervisors discretion, though not recommended when arming Barmine.

19. Lifelines An 18m lifeline is to be marked off such that, after an allowance for tying on, exactly 10m and 5m from diver to banksman is indicated. The markings are to be interwoven with the hawser lay of the lifeline such that they cannot accidentally be moved during minelaying. Additionally, a tactile marking system is to be incorporated for use at night as follows:

- a. 5m from diver One length of cordage spliced into the lifeline.
- b. 10m from diver Two lengths of cordage spliced into lifeline.

20. Preparation and concurrent activity Maximum preparation of mine stores is to be carried out concurrently with site recce and setting out as shown below:

ADS + 1

Recce
 Initiate 4017

2i/c + stores party

Cut XPM grillages to size
 Clean Mk 7. Grease fuze well threads
 Attach mine to XPM grillage
 Mark lifeline as described in para 19

21. Setting out and Recording The site is to be set out by the supervisor and No. 4 whilst the 2i/c and remainder of the party carry out preparation of stores detailed in para 20. The minefield is to be recorded on AFW 4017.

22. Setting Out Prior to deployment of the main body on site the bank is to be set out as follows; (Diagram 1 at Annex B refers):

- a. Fixed Datum Permanent datum selected by commander.

- b. Bank Centre-Line (27.5m)

(1) A-B is to be set out parallel to the waters edge. A and B are marked with 1.8m AI pickets.

(2) The centre-line must be accurately plotted using a prismatic compass and corrections for individual compass error (ICE) made. The Silva compass is not sufficiently accurate and is not to be used.

(3) A guideline of white mine marking tape is to be stretched taut along AB prior to placing intermediate mine marking pickets.

- c. Intermediate Mine Markers 0.6m Pickets, set out at 5.5m intervals along the Bank Centre-Line. Mines are preplaced adjacent to these markers before diving commences. On river banks prone to flooding or tidal action in estuaries 2m AI pickets may be required to ensure that the markers remain visible following any rise in water level. The 5.5m interval may be fixed either by tape measurement or pacing. The method selected must be standardised throughout the mine panel and is to be clearly shown on AFW 4017.

23. Recording The bearing and distance of the marker posts A and B relative to datum and one another are to be recorded on AFW 4017. The completed form is to be submitted to higher authority.

LAYING THE OUTER ROW

24. The front row facing the enemy bank, or 'outer row' of mines is completed before the diver commences the second row. The mines are preplaced adjacent to the marker pegs on the centre line before the diver enters the water.

25. The divers attendant is to control the movement of the diver using the lifeline, and through-water communication if available, and is to ensure that the diver maintains a distance of 10m from the bank centre-line when placing the mines.

26. Method The following procedure is to be strictly adhered to:

a. Attendant Positions himself at the marker post A retaining the 10m mark on the divers lifeline in his hand.

b. Diver

(1) Enters the water 5m upstream of Post A and is passed an armed mine c/w anchorage pin.

(2) Move out into midstream until the lifeline is taut. In fast flowing water it may be necessary to move upstream and out into midstream.

(3) Drift downstream, facing into current and maintain tension on the lifeline.

(4) In fast water the diver is to sink to the river bed facing upstream, holding the mine in front of himself at arms length. The diver is then to drift downstream hugging the bottom contours and maintaining downward pressure on the mine grillage to provide an anchor against the current.

(5) The attendant is to signal 2 pulls when the divers lifeline is at a right angle, (judged by eye), to the bank centre-line.

(6) On receipt of 2 pulls the diver is to fix the mine in position and secure with anchor pin(s) in the centre of the grillage on the upstream side. Barmines are then to be armed.

(7) When the mine is anchored the diver is to return the signal 2 pulls, drift down stream to avoid crossing previously laid mines then swim into the bank. The attendant is to take in the lifeline as the diver moves into the bank.

(8) The attendant is then to reposition himself at picket No. 2.

(9) The diver repeats the sequence detailed in paras (2) - (6) above until the last mine has been placed in line with Marker Post B.

LAYING THE INNER ROW OF MINES

27. Setting Out The second row is to be laid 5m from the bank centre-line, and mines are offset in relation to the front row as illustrated in diagram B2.

28. THE INTERMEDIATE MARKERS USED FOR THE FRONT ROW MUST FIRST BE PULLED UP.
29. A distance A - A' (2.75m) is to be marked along the bank centre-line AB. Intermediate mine markers are then re-established from A' at 5.5m intervals along the centreline.
30. MK 7 mines/Barmines with grillage plates and pins are preplaced on the intermediate mine markers.
31. Control of the diver's movements is to be by means of lifeline signals from the attendant, or through-water communications if available. The attendant is to ensure that the diver maintains a distance of 5m, as indicated by the lifeline marking, from the centre-line when placing mines.
32. Method The drill used in setting out the front row as described in para 24 is repeated until the last mine is laid 5m offshore from the bank centre-line and in line with the last mine marker. (2.75m short of marker post B) See diagram 1 at Annex B.

RECOVERY FROM SITE

33. On completion of AFW 4017 the site is to be cleared of all marker pickets and mine stores/accessories.
34. Marker post A is to be replaced with a 0.6m picket driven flush to ground level.
35. Perimeter fence A marked perimeter fence is to be set out on the home and enemy banks if the under-water minefield is not established as part of a tactical obstacle. See completed 4017 at Annex D.

DIVING OPERATIONS

36. Diving Boots The diver will require weighted boots and additional weight on the weight belt if working in currents greater than 1m/s.
37. Lifeline Signals The diver is unable to return lifeline signals when carrying the mine to site, therefore:
- a. Briefings must be thorough.
 - b. Signals must be minimal up to the point at which the diver reaches the projected position of the mine.
 - c. Through-water communication should be used if available.
38. Anti-handling Devices These are not to be fitted due to the danger of mishandling in poor visibility/cold water.
39. Hardened Sites (NATO) If a hardened site is to be denied to the enemy by underwater mining grillage plates are to be anchored in position on the concrete pad using 2x $\frac{3}{8}$ " diameter Tornado bolts and butterfly nuts. All bolts are to be fired into position using the sequence detailed in para 24 before any mines are placed. The diver then carries out an additional laying sequence to place the mines.

DETECTION AND RECOVERY OF MINES

40. General During the counter-attack or after cessation of hostilities, Engineer diving teams will be required to breach and recover NATO underwater minefields, using the information available on AFW 4017. An example is shown at Annex D.

41. Safety The following precautions are to be strictly observed:

- a. The diver is to be made aware that he is drifting over armed mines.
- b. The Supervisor is to ensure that there is a minimum number of personnel in the water at any time.
- c. If any doubt exists as to the condition or state of a mine it is to be pulled.
- d. The diver is only to enter the water via the distance lines at either end of the panel.
- e. All cleared areas are to be marked.

42. Method The underwater minefield is cleared in 3 phases using a single-line jackstay:

- a. Phase I Clearance of bank from Bank Centre-Line E to water line.
- b. Phase II Clearance from water line out to 4m beyond the bank centre-line ($E + 4m$)
- c. Phase III Clearance of mine rows
 - (1) Inner Row
 - (2) Outer Row

43. Manpower A team of five is required as follows:

Supervisor Recorder

- No. 1 Diver
- No. 2 Diver's Attendant
- No. 3 Standby Diver
- No. 4 Mine recovery from diver

44. Minimum Team If tasks are combined a minimum of 4 personnel can be employed as follows:

Supervisor/recorder (ADS/UDS)

- No. 1 Diver
- No. 2 Diver's Attendant
- No. 3 Standby diver/mine recovery from diver

PHASE I

45. Preparation Prior to deployment to the task site the following action is to be taken:

- a. Obtain copies of 4017.
- b. Initiate site recce.
- c. Construct a jackstay.
- d. Obtain Barmine disarming pins, C spanners clips and transit domes for the Mk 7 A/TK mine.
- e. Prepare the divers lifeline and described in para 19. Arrange for repalletisation of mines and transport from site.

46. Setting out site for recovery Refer to diagram 3 at Annex B. The datum must first be located from AFW 4017 and picket A re-established. The Bank Centre Line is then accurately set in using a prismatic compass and the pickets A-B placed in position. A Silva compass is not sufficiently accurate and must NOT be used.

47. The ground between C and D on the Bank Centre Line is to be cleared with a MK IV mine detector before picket B is re-established.

48. A distance A - A' (2.75m) is marked on the E and intermediate mine markers are then re-established at 5.5m intervals to indicate the position of the mines in the inner row; as shown in Diagram 3 at Annex B.

49. Picket C As shown in diagram 2 at Annex B, a third 2m picket C is to be established 5m beyond A in line with E.

50. The area between the E BC and the waterline is then to be cleared with a mine detector.

PHASE II

51. Waterline to E + 4m This area is to be hand breached by 4 personnel in diving dress. Mine goggles are to be worn. To provide a definite boundary to the cleared area a jackstay is laid prior to hand breaching as follows:

- a. Single Line Jackstay Minimum traffic in/over the u/w minefield is essential: the jackstay is therefore to be panel length + 10m (40m) and is laid from the shore. It must be positioned accurately and pulled taut before the first search. The jackstay is laid out from the upstream anchor in the following sequence.
- b. The anchor is positioned by diver or wader 4m offshore from C or in a position where the depth of water is at a maximum of 0.75m. A distance line constructed of cordage of not less than 1½ inch circumference is to be fixed between the shank of the anchor and Picket C to ensure that the anchor cannot drift outwards.
- c. The jackstay is then paid out along the riverbank. When taut the downstream end and shot is carried offshore by a diver/wader. A distance line of 1½" cordage is to be fixed between the shot and a peg D positioned in line with the E to ensure that the shot is exactly 4m from the E.

52. The position of the breaching party relative to the E is to be controlled by the supervisor such that the area is cleared in 1m wide 'lanes' parallel to the E. This is essential to ensure that the shallows are thoroughly cleared to within 1m of the inshore mine row, ie to the jackstay.

53. Clearance of water line to E + 4m is to be carried out UPSTREAM from B to C, to 5m beyond A; as shown in diagram 3 at Annex B. The clearance party are to use the following methods:

- a. Underwater mine detector (if available)
- b. Prodders
- c. Touch

54. Action on a find during Phase II As soon as a mine is located the breaching party is to be halted by the supervisor and the following drill carried out:

- a. Diver attempts to identify mine and reports to supervisor.
- b. All other members of breaching party leave the water.
- c. Diver to neutralise the mine if Barmine or Mk 7 A/TK mine is positively identified. If other mines are found the breaching operation is to be halted.
- d. Pull mine and remove to stores dump. Mark the appropriate intermediate mine picket with white tape.
- e. Continue the search from the marked picket until phase II is completed.

PHASE III

55. Search and Recovery The diver is to enter the water from C, moving along the distance line to the anchor. CARE MUST BE TAKEN TO ENSURE THAT THE DIVER DOES NOT HAUL ON THE DISTANCE LINE AND DISLODGE THE ANCHOR. The diver must be attended from upstream to ensure that the current will tend to carry the diver INSHORE away from the mine rows.

56. From the anchor the diver is to carry out a single line jackstay search in a downstream direction. The diver is to face upstream, hold the rope with his LEFT HAND and search with his right.

57. Modified Method in Slack Water In slack water or where the current velocity does not exceed 0.5m/s the direction of search can be upstream to avoid the need for the diver to drift backwards within 1m of the assumed position of a mine row. The method is as follows:

- a. The diver is to wear boots with lead insoles.
- b. The diver is to enter the water from D moving along the distance line to the shot. Care must be taken that the diver does not haul on the distance line and dislodge the shot. The diver must ensure that the jackstay has been correctly laid, is clear of obstructions in the river bed and remains taut at all times.
- c. From shot the diver carries out a single line jackstay search facing upstream holding the rope with his LEFT hand and searching with his right.

58. Moving the Jackstay If no mines are located on the first search the anchor and shot are to be moved 0.5m offshore by the diver and the search repeated. In fast water great care must be taken to ensure that when moving the anchor the diver is not swept downstream.

59. Action on Locating a Mine The diver is required to identify the mine. If a barmine or mk 7 A/TK mine is positively identified it is to be neutralised; the diver is to signal 2 pulls when this is done to indicate that No. 4 should enter the water. The anchor pin is then to be removed and the mine/grillage assembly passed to No. 4. The following sequence must be strictly adhered to:

- a. Identification The diver is to identify the mine and take the following action:

- (1) MK 7 Leave fuze in situ. Pass to No. 4 ARMED.
- (2) Barmine Neutralise and pass to No. 4.
- (3) Unidentified or Corroded Mines If the mine is not clearly identifiable as a MK 7 or Barmine or there is any corrosion of the mine casing, the mine is not to be recovered by hand. It must be pulled after all divers have left the water.

b. Recovery Diver signals 2 pulls. No. 4 enters the water on the downstream side of the divers lifeline to collect the mine/grillage assembly. No. 4 may be equipped with face mask and snorkel at the supervisors discretion.

c. Procedure for Pulling The standby diver is to enter the water downstream of the divers lifeline and take the pulling line to the find.

d. When mine is returned to the bank party the attendant is to signal 3 pulls and the diver continues with the search. The intermediate mine marking picket opposite the find is then marked with white tape.

e. MK 7 mines are disarmed and pins replaced in barmines by No. 4 on the bank. This is to be carried out in a mine storage area 25m from the water line prior to moving the mines to a mine dump.

60. The sequence is repeated until all mines are recovered from the inner row. The jackstay is then moved 0.5m offshore and the intermediate mine marking pickets are relaid in line with the positions of the mines in the outer row (see para 22).

STORES AND EQUIPMENT

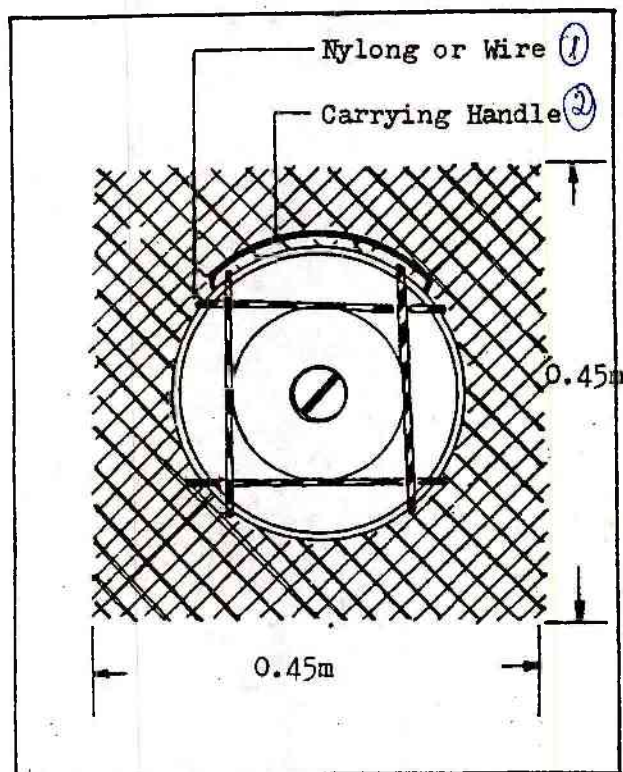
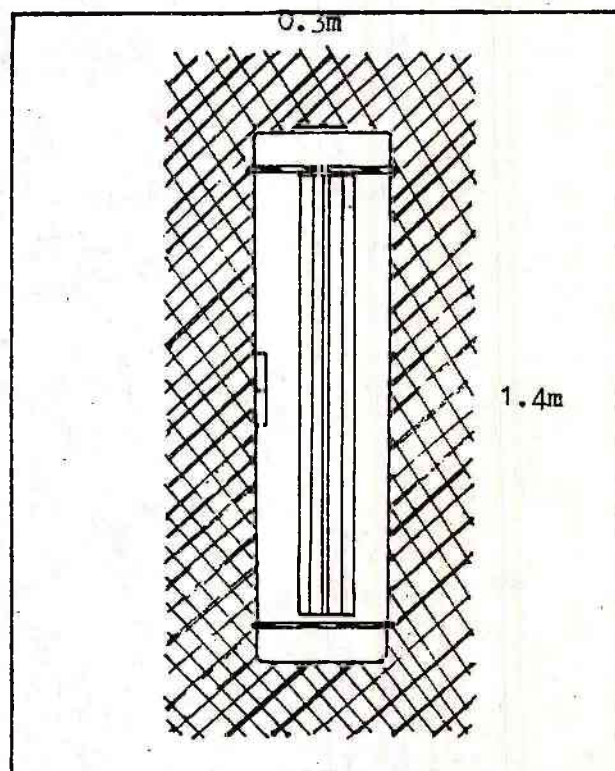
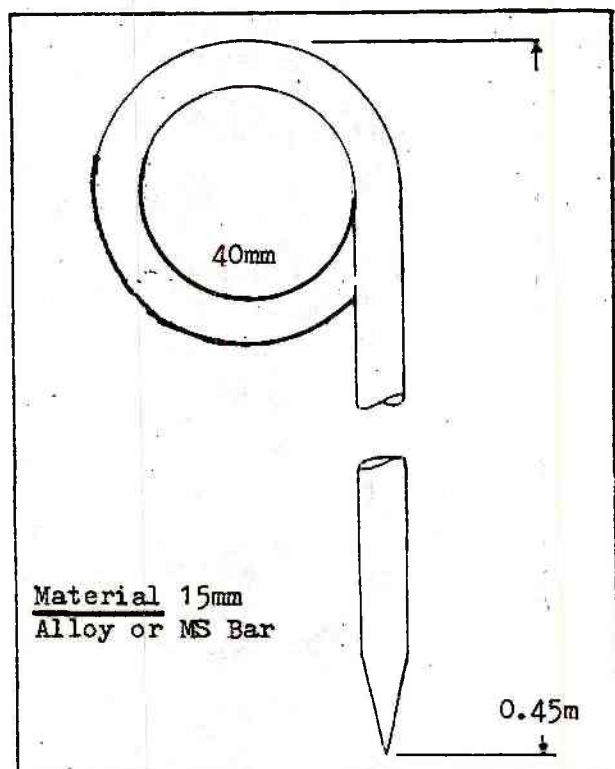
61. Stores required for laying and recovering a 2 row panel 30m in length are listed in Annex C. Diving stores are not included in the table.

LABOUR CONSTANTS

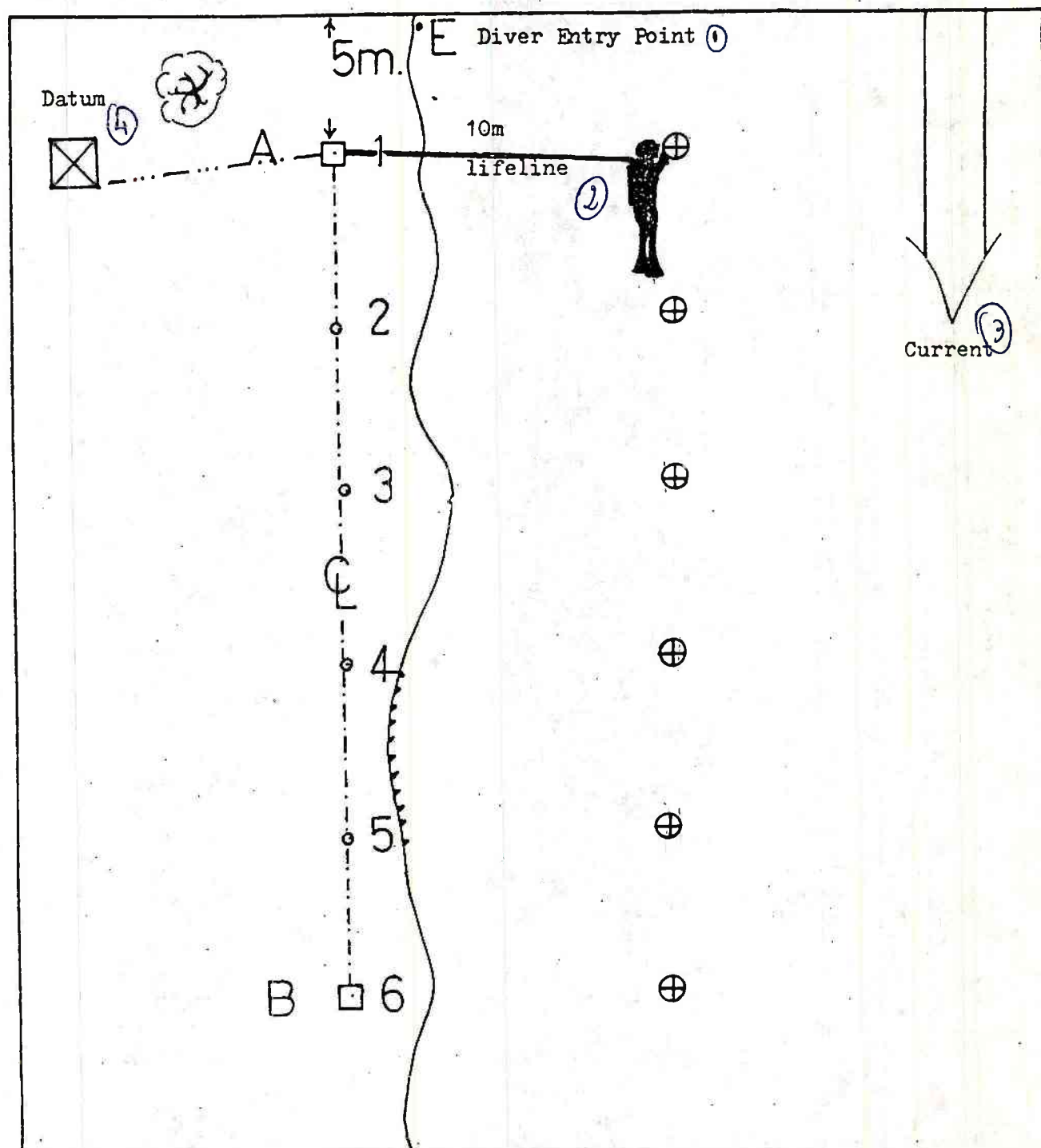
62. The following table indicates the time required to execute the task. The constants assume that the diving team is worked up and experienced in the drills, and times given are calculated from arrival at site.


Table 1 Labour Constants


Ser	Task	Minimum Diving Team	Max Depth	Max Current	Work Rate		Remarks
					Good Vis/Day	Poor Vis/Night	
1	Placement of a 30m panel of mines	1 ADS/ADO 3 ACAD/AAD	2m	1.5m/s	1 hr	1 hr 30min	1 diver
2	Detection and clearance of 30m panel of mines	1 ADS/ADO 3 ACAD/AAD	2m	1.5m/s	3 hrs	3 hrs	1 diver
3	Prepare 30 mine/grillage assemblies	1 man	N/A		MK 7 A/TK Barmine	1½ hrs 1 hr	


FIXING OF GRILLAGE PLATES AND ANCHORDiag 1 Mk 7 Mine Grillage PlanDiag 2 Barmine Grillage PlanDiag 3 Anchor PinsNOTE


1. Diagrams are not to scale.
2. Grillages are manufactured from XPM.
3. Anchor pins manufactured from 15mm diam bar.
4. Mines secured to grillage with nylon cordage or 14 gauge wire, in the pattern shown in diagrams 1 and 2.

Diag 1. SETTING OUT BANK CENTRE LINE AND LAYING OUTER ROW

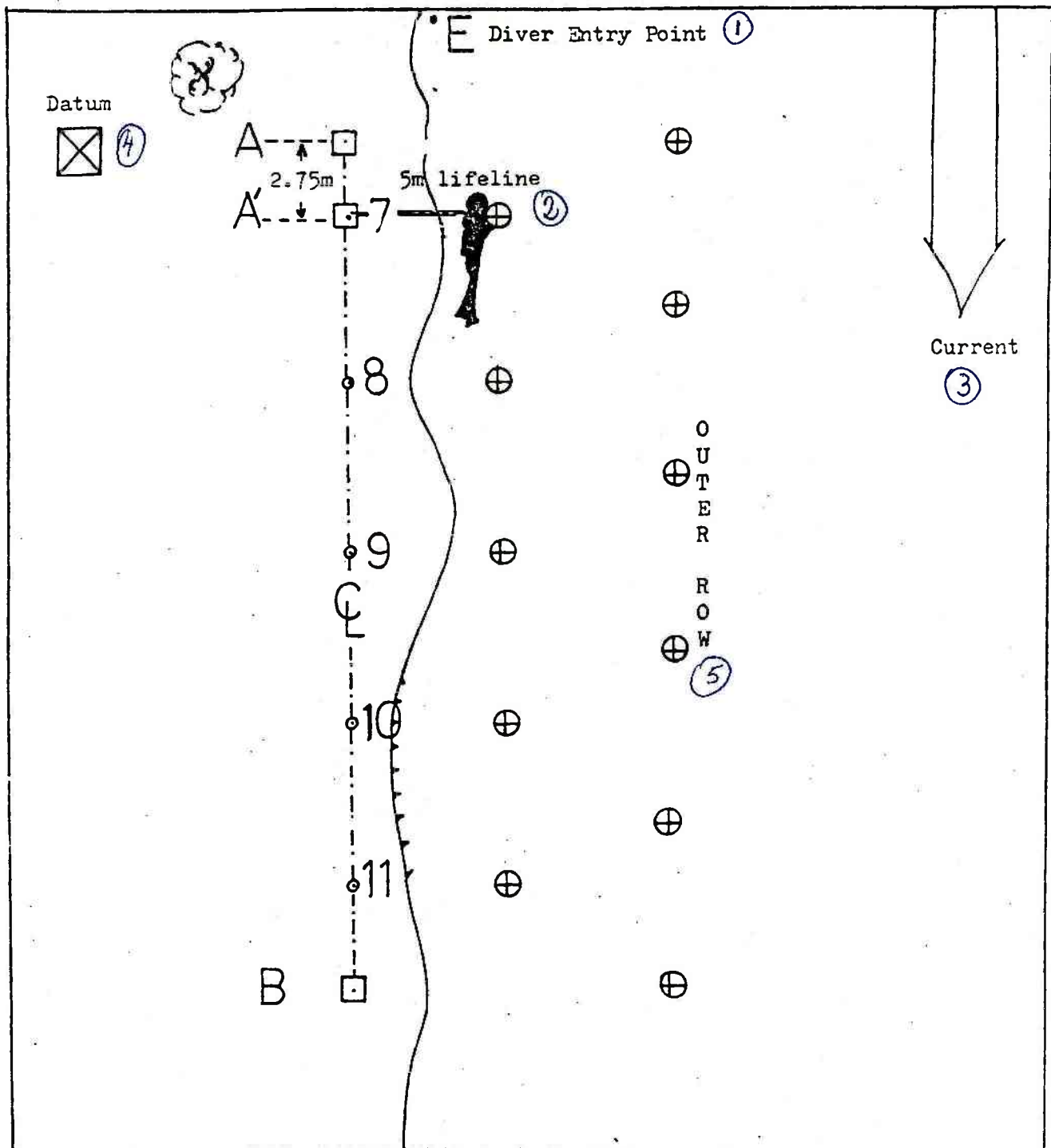
Key  Centre line A - B
27.5m in length

 2m AI Picket

 0.6m AI Pickets at 5.5m intervals

 Projected position of mines at 5.5m intervals

Diag 2. SETTING OUT AND LAYING THE INNER ROW



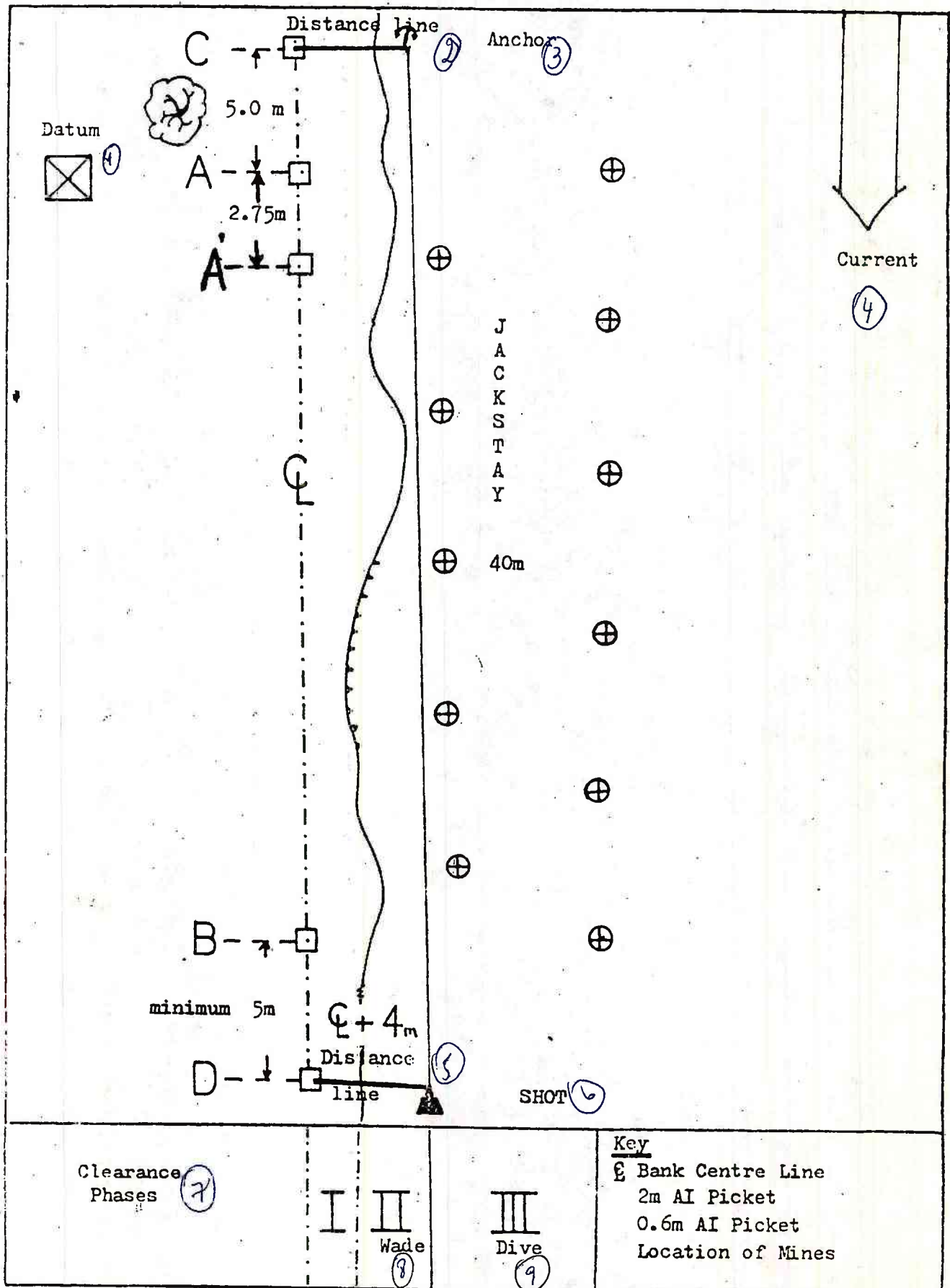
Key C Bank Centre Line

⊕ Projected location of mines

□ 2m AI Pickets

○ 0.6m IA Pickets

Diagram 3. SETTING OUT TO BREACH AND RECOVER



STORES LIST FOR MINE LAYING AND RECOVERY
2 ROW PANEL 30m IN LENGTH

Diving stores are not included.

1. Minelaying Stores

- a. 1 x AFW 4017.
- b. 4 x 2m pickets.
- c. 11 x mine marking pegs (0.6m pickets).
- d. 11 x mine anchorage pins.
- e. 11 x mine grillage plates.
- f. Nylon cordage or SWR to secure mine to grillage plate.
- g. 1 x Monkey.
- h. 1 x Mash Hammer.
- j. 1 x 30m tape.
- k. 1 x Prismatic compass.
- l. 11 x MK 7 or Barmines, c/w mine arming stores, incl C spanners.
- m. Minefield perimeter marking equipment as required.
- n. Divers lifeline marked as described in para 19 of this precis.

2. Recovery

- a. AFW 4017.
- b. 1 x 40m jackstay, constructed of $1\frac{1}{2}$ " ϕ cordage.
- c. 2 x 15m lengths of $1\frac{1}{2}$ " cordage (Distance lines).
- d. 1 x anchor. A 'fisherman's' or 'Pontoon' type is to be used.
- e. 1 x 56lb shot.
- f. 4 x 2m pickets.
- g. 11 x mine marking pegs (0.6m pickets). (2m AI pickets will be required if river has flooded since laying).
- h. Disarming pins and/or C spanner and accessories for MK 7 mines.
- j. 1 x 30m tape and mine marking tape.
- k. 1 x prismatic compass.
- l. Prodders, short.
- m. Underwater mine detector if available.
- n. MK IV mine detector.
- o. Monkey.
- p. Mash Hammers x 2.
- q. Mine Goggles.



ANNEX T TO CHAPTER 11 SUBAQUA DIVING

Introduction

1. Subaqua diving is an adventurous training activity demanding and developing physical fitness, courage, self discipline, skill and the ability to think quickly in an emergency.
2. As there is an element of danger involved in subaqua diving it must be correctly organized and supervised in accordance with this publication and the current edition of the British Subaqua Club (BSAC) Diving Manual.
3. It may be necessary for commands to issue additional special orders to allow for local conditions.

General Conduct

4. The overall control of subaqua diving will be through the Army SubAqua Diving Association (ASADA). The names of ASADA officers are published annually in DCIs.
5. Most Service subaqua clubs are special branches of the BSAC and Army subaqua divers are expected to join the BSAC in their own long term interest.

Diving Training and Responsibilities

6. Diving training, including pool training, should, where possible, be supervised by a BSAC Club instructor. Where this is not possible, a BSAC Advanced Diver, or exceptionally a BSAC Leader, may be authorized by their clubs to take on this responsibility. Open water snorkelling may be supervised by a BSAC Dive Leader or above authorized by his club to do so, but overseas commands may authorize a BSAC Sports Diver to supervise snorkelling activities if local conditions permit. A local command order is to be published to this effect in accordance with para 3.
7. Diving and diving training, including snorkelling, is to be conducted in accordance with the current edition of the BSAC manual, except for the use of decompression tables. For instructions regarding these, see Safety Orders (para 16).
8. **Open Water Diving.** Subaqua diving is to be controlled by a qualified subaqua diving supervisor (SADS). A subaqua diving supervisor is either:
 - a. A diver who has passed the Joint Service subaqua diving supervisors course at JSSADC Fort Bovisand, or
 - b. A qualified Army Diving Supervisor (ADS) who is fully qualified to at least BSAC Advanced Diver, and a current member of BSAC.

In all cases the qualification is to be recorded in the diver's log book and certified by the appropriate Service diving school. The diver's BSAC qualification record will be certified by the command association. An entry is also to be made in the holder's Service records. All SADS are to register annually with ASADA for this qualification to remain valid.

9. Overseas qualifications. Overseas commands, other than BAOR, whose divers are to qualify in accordance with para 8, are to have their own system of qualifying subaqua diving supervisors. This qualification is to be implemented by the command subaqua diving association and is to be based on the following:

- a. The diver is to be a BSAC Advanced Diver.
- b. The diver may be a Service trained Army diving supervisor providing he knows how to instruct divers in BSAC techniques and is fully acquainted with BSAC methods of open water diving.
- c. The diver may be of any rank, but it would be normal for him to be at least an NCO. He should satisfy the command subaqua diving association on the following point:
 - (1) His sense of responsibility.
 - (2) His technical knowledge and ability (see Appendix 1 to this Annex).
 - (3) His instructional ability.
- d. The diver must be medically fit in accordance with para 17 and Appendix 2 to this Annex.
- e. The diver must have completed at least 10 open water dives within the last year.
- f. An application to become a subaqua diving supervisor is to be supported by a recommendation signed by the applicant's command officer and his club diving officer.

This qualification will lapse when the holder leaves the command, and these divers are to qualify as soon as possible as diving supervisors through the Joint Service SubAqua Centre, Fort Bovisand. Applications for courses should be made through the command subaqua association. Local SADS qualifications may only be issued by the chairman of the command subaqua association, and they are to register annually with ASADA.

10. Diving on duty. A diver may be considered to be 'on duty' within the terms of reference of this annex when the following conditions are observed:

- a. The dive is supervised by a subaqua diving supervisor. Where more than one is present it must be clearly established who is in charge at any particular time.
- b. The diving officer or his deputy agrees to the planned dive.
- c. There is a written dive plan with the names of all personnel diving logged on it.
- d. The diving training including pool training is supervised within the terms of para 6.

APPENDIX 1 TO ANNEX T TO CHAPTER 11
THEORETICAL EXAMINATION SYLLABUS
(Paras 9c(1) and 32 refer)

1. Introduction. The syllabus shown below is used by the BSAC to qualify BSAC Advance Divers. It should be used as a guide by command subaqua diving associations when assessing the suitability of a candidate as a subaqua diving supervisor. The candidate should have a sound knowledge of this syllabus.

2. Medical Physiology

- a. Medical requirements for divers, X-rays, examinations etc.
- b. Respiration and anoxia.
- c. Artificial respiration (expired air method).
- d. Effects of pressure on the body, particularly ears and sinuses.
- e. Cause, symptoms and cure of:
 - (1) Carbon dioxide poisoning.
 - (2) Anoxia.
 - (3) Air embolism.
 - (4) Decompression sickness.
 - (5) Oxygen poisoning.
 - (6) Nitrogen narcosis.
 - (7) Exhaustion and exposure.
- f. Decompression tables.

3. Diving Supervision and Skills. The principles of:

- a. *Safety precautions.* Use of life lines, buddy lines, shot line, safety boats, snorkel cover, shore lookouts etc.
- b. Diving signals.
- c. Rescue and life saving.
- d. Snorkel diving techniques.
- e. Open water diving.
- f. Underwater navigation.
- g. Air endurance.
- h. Low visibility diving.
- i. Safety and emergency procedures.
- j. Boat diving.
- k. Diving expeditions.

- l. Deep dives and open water.
- m. Basic seamanship
- n. Charts and tides.
- o. Basic navigation.
- p. Roped diver operations.

4. Equipment

- a. Basic equipment (mask, snorkel, fins).
- b. Protective clothing.
- c. Principle of the aqualung.
- d. Aqualung use and buoyancy control.
- e. Maintenance of equipment.
- f. Air cylinders, recharging.
- g. Diving accessories.
- h. The ABLJ — its use and application.
- i. Diving air compressors.

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APPENDIX 2 TO ANNEX T TO CHAPTER 11

SUBAQUA DIVING
MEDICAL CERTIFICATE
(Paras 9d and 18 refer)

Part 1. To be completed by the diver.

1. Number Rank Name and Initials
(Block letters)
2. Address
3. Date of birth
4. Height Weight
5. Have you ever suffered at any-time from any of the following:
Answer YES or NO, if YES give details:
 - a. Ear trouble, earache, ear discharge
 - b. Attacks of giddiness
 - c. Sinus trouble
 - d. Chest disease, asthma, bronchitis
 - e. Fits or any nervous disorders
 - f. Blackouts or fainting attacks
 - g. Diseases of the heart and circulation, including high blood pressure
 - h. Claustrophobia

6. I hereby declare that to the best of my knowledge, information and belief I am fit to take part in subaqua diving, and declare that I have not omitted any information which might be relevant to my fitness for diving.

Signed Date

Part 2. To be completed by doctor

7. The date of his/her last X-ray is

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8. The above named has been medically examined in accordance with the standards laid down in this Appendix and he/she is in my opinion fit to take part in subaqua diving activities.

Signed Unit
(Medical Officer)

Date Address
.....
.....

NOTE:

1. This certificate is only valid for one year.
2. At an early stage of diver training all divers are to check that their eyesight is as good underwater as it is in air or better, and if it is not they are to take action to correct their eyesight underwater by the use of a mask with corrective lenses, or other suitable means.
3. At all stages of the dive, the diver must be able to read the time on his watch and depth on his depth gauge.

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MEDICAL STANDARDS

1. All personnel who undertake subaqua diving are to have an annual medical examination including chest X-ray. The results are to be recorded in their log books and on form Med 143 for inclusion in their F Med 4. Beginners are to be examined before commencement of aqualung training.

2. Treatment of acute conditions must have been completed before a certificate of fitness is given. A candidate should be found unfit if he fails to satisfy the following standards:

- a. *General.* He must not suffer from any condition which could lead to loss of consciousness such as epilepsy or diabetes requiring insulin; a history of blackouts, recurrent headaches, severe or repeated concussion or cranial surgery; psychiatric conditions in any form; or any disability or deformity which excessively limits the ability to swim.
- b. *Eyesight.* The eyesight must be such that any person supervising diving can see if any of the divers are in difficulties. Visual acuity with or without correcting lenses should not be worse than 6/12 (Sneller) using both eyes together.
- c. *Ears.* Both tympanic membranes must be intact and mobile. The Eustachian tubes must be patent (Valsalva test). There must be no evidence of active or chronic middle or outer ear disease.
- d. *Respiratory system.* There must be no personal or recent family history of tuberculosis. The respiratory excursion must be adequate and conditions such as chronic emphysema, indicating a diminished vital capacity, are unacceptable. There should be no history of chronic catarrh, asthma, lung cysts, spontaneous pneumothorax, or recurrent sinus trouble.
- e. *Cardiovascular system.* There should be no impairment of exercise tolerance, eg after stepping onto a chair 5 times in 15 seconds, the pulse should return to normal within 15 seconds. There should be no clinical cardiovascular disease. Systolic blood pressure should not exceed 140 mm/Hg and diastolic should not exceed 100 mm/Hg.
- f. *Teeth.* Artificial dentures must be removed before diving. The diver must be able without dentures to grip the mouthpiece and obtain a complete seal of the mouth. This is to be checked by the diving officer.

3. In cases of doubt advice should be sought from the Senior Medical Officer (Underwater), Institute of Naval Medicine, Alverstoke, Gosport, Hants.

Military vehicles and equipments, or equipment purchased from public funds, may be used for dives which are 'on duty' within this definition.

Responsibility of the Subaqua Diving Supervisor

11. In order that the subaqua diving supervisor can do his job properly he must remain an active diver and keep himself up to date with subaqua diving procedures and safety regulations. He is responsible for the overall conduct of diving and safety, whether in the water, in boats or on shore during a dive. His particular responsibilities are:

- a. To ensure that diving is conducted within this instruction and the capabilities of the divers and the equipment being used.
- b. To ensure that the diving equipment being used is in a safe and efficient state in accordance with the manufacturer's instructions and the BSAC Diving Manual.
- c. To ensure the whereabouts of submerged divers are known at all times, and, if conditions demand, he should not hesitate to use life lines, buddy lines and surface marker buoys to ensure that he has this knowledge.
- d. To ensure that diving records and divers' logs are maintained. Diving records are to be maintained for at least a year. Normally a diving log should be maintained at the diving site on a slate provided from public funds in the form shown at Appendix 3 to this Annex. However, forms S 1627 may be used as a diver's log, but it is to be retitled SUBAQUA DIVER'S LOG.
- e. He is to have with him on the dive site:
 - (1) A current edition of the BSAC Diving Manual and a copy of the RN decompression tables is at Appendix 4 to this Annex.
 - (2) A first aid kit.
 - (3) A knowledge of where the nearest recompression chamber is located, and the contact telephone number.
 - (4) The location and the telephone numbers of the local police or coastguard and ambulance or doctor.
 - (5) A watch.
 - (6) Diving log sheets.
 - (7) A rigid diving flag (International Code of Signals Flag A).
 - (8) A diver recall system eg weighted thunderflashes.
 - (9) Report form for subaqua diving accident or incident (see Appendix 5 to this Annex).

12. A subaqua diving supervisor is always to be present on the surface when diving is taking place. Exceptionally in the absence of a second diving supervisor a diving supervisor may dive himself when he is satisfied that it is safe to do so and an experienced diver, preferably a BSAC Advanced Diver or above, remains on the surface in charge of operations.

13. A subaqua diving supervisor is to appoint a dive leader for each underwater group. A single dive leader may not control more than 3 other divers.

14. The diving supervisor is to ensure that the efficiency of the diver has not been impaired by the consumption of alcohol or drugs (eg seasickness tablets).

15. The diving supervisor is to inform his unit or club where diving is taking place and when the group expect to return to unit or base location.

Safety Orders

16. The main safety orders are given below but diving supervisors are responsible for applying their knowledge in order to ensure diving is conducted safely.

- a. Compressed air only is to be used in breathing apparatus. The purity of this air is to be in accordance with Def Stan 68-75/Issue No 1 dated 31 Mar 83, or BS 4001 which is given in BSAC Paper No 1 'The Production of Air from Oil Lubricated Compressors'. When using compressors the air intake must be upwind and clear of exhaust fumes to prevent carbon monoxide being compressed into the cylinders of the breathing apparatus.
- b. Diving is not to exceed 36 metres (120 feet) without prior special permission in writing from the appropriate command subaqua association. Command subaqua associations may permit diving to a maximum of 45 metres (150 feet) when there is a good reason to go to this depth, the divers involved are suitably experienced and proper safety precautions will be taken. Permission will not be given lightly.
- c. Diving is not to take place in recognized shipping lanes or in active danger areas unless permission has been obtained from the authorities concerned.
- d. A lifejacket, either an adjustable buoyancy lifejacket (ABLJ) or buoyancy compensator (BC) is always to be worn by a diver in the water, this includes sports divers wearing dry suits. The use of the ABLJ should be in accordance with the practice recommended currently by the BSAC. Oral inflation of the lifejacket is not a recommended practice.
- e. Knives are always to be worn by divers in the water.
- f. A diver is never to dive alone except when properly roped and tended. Ropes are to be secured to divers by using a bowline round the chest so the diver can ditch his equipment. The free end is to be secured inboard or on shore.
- g. When buddy lines are in use, only 2 divers are to be connected to one buddy line.
- h. Surface cover is to be provided whenever possible. This may be a boat, snorkel diver, or other floating device.
- i. Decompression is mandatory for any dive covered by the decompression schedules in Appendix 4 to this Annex. There is to be no diving below the limiting line. No other tables are to be used for dive planning or decompression.
- j. A standby diver, ready dressed, tended and roped, capable of diving to the necessary depth, is to be present when diving is carried out in hazardous

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SERVICES DIVE LOG

(Para 11d refers)

CARTA DE BUCEO

SUPERVISOR SUPERVISOR DEPUTY SURLENTE

COX(s) TINONEL

SITE SITIO DATE Fecha

WEATHER CLIMA WIND VIENTO

HIGH WATER AGUAS ALTAS LOW WATER AGUAS Bajas

SEA STATE ESTADO del MAR SEA TEMPERATURE TEMP. en el MAR

COAST GUARD Guarda costa HOSPITAL hospital

RECOMPRESSION CHAMBER Cámara de recompression

Divers	Cylinder Size	Bars In	Bars Out	Time In	Time Out	Dive Duration	Max Depth
1	<u>Buzos</u>	<u>Tamaño cilindro</u>	<u>Bars adentro</u>	<u>Bars afuera</u>	<u>Tiempo Adentro</u>	<u>Tiempo Afuera</u>	<u>Dura ción</u>
							<u>Profundi- dad</u>
2							<u>Buzos</u>
3							<u>M'sx.</u>
4							
5							
6							
7							
8							

COMMENTS

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APPENDIX 4 TO ANNEX T TO CHAPTER 11

TABLE 11 RN DECOMPRESSION TABLE

(See paras 11e(1))

TABLE 11 STOPS
SURFACING TIME IN MINUTES
MAXIMUM DEPTH IN METRES

DETENCIONES
TIEMPO EN LA SUP.
PROFUNDIDAD
EN METROS

TIMES ON BOTTOM IN MINUTES

	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60
8														10b	10b	10b	10b	15
9													5	10b	10b	10b	10b	15
10												5	5	10b	10b	10b	10b	15
11												10b	10b	15	15	20b	25b	25b
14											5	10b	10b	15	15	20b	25b	25b
15						NO STOPS				5	5	10b	10b	15	15	20b	25b	25b
17										5	10b	15	20a	25b	25b	30c	35b	
20									5	5	10b	15	20a	25b	25b	30c	35b	
25								5	10b	10b	15	20a	30b	35b				
30							5	10b	15	20a	25a	30b						
35						5	10b	15	20a	25a	30b							
40						5	10b	15	25a	35a								
45					5	10b	25a	25a	30b									
50					5	10b	20a	30b										
55					5	15	25a	35a										
60					10b	20a	30b											
65				5	15	25a	35a											
70				5	15	25a												
75				10b	20a	30a												
80				10b	25a													

KEY FOR STOPS

		STOPS (Mins.)		
		9m	6m	3m
DECOMPRESSION TIME IN MINUTES	5	—	—	5
	10a	—	—	10
	b	—	5	5
	15	—	5	10
	20a	—	5	15
	b	5	5	10
	25a	—	5	20
	b	5	5	15
	30a	—	5	25
	b	5	5	20
	a	5	10	15
	35a	5	5	25
	b	5	10	20

NOTES:

OBSERVACIONES

1. STEPPED LINE L-L IS LIMITING LINE.
2. THIS ABBREVIATED VERSION OF TABLE II IN NO WAY REPLACES THAT PRINTED IN BR.2806 WHICH SHOULD BE REFERRED TO FOR ANY DEPTHS AND TIMES NOT SHOWN ABOVE.

1. Línea de escalonamiento L. Las la línea límite
2. Esta versión abreviada de la tabla II en ninguna forma reemplaza la impresa en BR 2806, lo que debe recurrirse, en lo que respecta a cualquier profundidad y en horas, que no aparecen antes.

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conditions eg in certain circumstances when diving in fast flowing water or wreck diving and always when diving under ice. His equipment is to be tested prior to the other divers entering the water.

- k. Special attention should be paid to the instructions in the BSAC Diving Manual on taking beginners into open water on their initial dives. Command subaqua associations are advised to write instructions on the safety procedures to be adopted by their subaqua clubs taking into consideration local conditions.

Medical

17. All personnel who undertake subaqua diving are to have an annual medical examination including chest X-ray. The results are to be recorded in their log books and on Forms Med 143 for inclusion in their F Med 4. Beginners are to be examined before commencement of aqualung training. Treatment of acute conditions must have been completed before a certificate of fitness is given.

18. The format at Appendix 2 to this Annex is suitable as a medical certificate. The standards required for a diving medical are given on the reverse of this form.

Accidents and Incidents

19. In the interests of the progress of diving safety it is essential that reports of diving accidents and incidents, equipment failures, etc are made. In no other way may divers learn from their mistakes and misfortunes of others. A report is to be made in accordance with the form at Appendix 5 to this Annex. The submission of the form is not to be delayed in order to complete the form fully. Additional information should be added to a second form as it becomes available.

20. In serious cases involving immediate hospitalization or a fatality, normal NOTICAS procedure is to be observed and in addition, a report is to be made immediately by telephone or signal to:

Officer Commanding
RE Diving Establishment
HMS Vernon
PORTSMOUTH
PO1 3ER

Telephone: Portsmouth Naval Base Ext 24604 or Portsmouth Civil 822357 Ext 26404

Signals: SCHODIVING Using SIC LOB.

All signals are to be copied to MODUK ARMY for PAT 2 using SIC B4G and to ASADA will be notified through MOD (PAT 2). (The format of the report is given in Appendix 5).

21. Equipment involved in an accident is to be secured intact until an investigation has been ordered, if it is considered necessary, by MOD (PAT 2) as advised by OC

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ASADA and REDE. Cylinder valves which have been closed are not to be reopened until the investigation. The number of turns to close the valve should be noted if possible.

22. Accidents or incidents on adventurous training exercises away from unit locations are to be dealt with in a similar way but it may be necessary to hold a preliminary investigation on the spot. The expedition leader should order an enquiry if he considers it necessary. Initial statements are to be taken as soon as possible after the accident or incident.

Application of this Instruction

23. This instruction applies to serving British Army personnel only. Personnel of NATO and Commonwealth armies, civilians and dependants may join Service subaqua diving clubs and take part in expeditions. However, when they do so the following conditions apply:

- a. They must agree to abide by the rules of this instruction.
- b. They are to comply with the Insurance Requirements at Annex J to this Chapter.
- c. They are not allowed to benefit directly from any allocation of public or non public funds.

24. Divers from the RN and RAF may join any Army club or take part in any Army sponsored expeditions under the terms of this instruction provided they have the agreement of their own Service.

25. Diving qualifications and experience of divers not known to a club or expedition are to be checked carefully by the club diving officer or subaqua supervisor, before the diver is allowed to take part in diving or instructional tasks.

Adventurous Training Expeditions

26. **Planning.** The planning and clearance of subaqua diving expeditions is to be done in accordance with this instruction and current command or district orders. One copy of the application is to be sent to the secretary of the command subaqua association (in UKLF the UKLF Diving Officer). All Army expeditions and Army sponsored Joint Service expeditions are to have the prior approval of the ASADA. Units intending to dive or train divers during overseas training are advised to plan well ahead on the requirement for subaqua supervisors, instructions and equipment.

27. **Expedition leader and diving officer.** Each expedition is to have an expedition leader and a diving officer. On small expeditions they may be the same person. The diver officer is to be a qualified subaqua diving supervisor. He may be of any rank but would normally be at least an NCO. He is responsible for all diving activities. The expedition leader should be chosen as the person most suited to be in overall command; it would be advantageous if he were to be a subaqua diving supervisor.

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**APPENDIX 5 TO ANNEX T TO CHAPTER 11
REPORT OF UNUSUAL DIVING INCIDENT OR ACCIDENT
(Paras 11e(9) and 19 to 22 refer)**

Notes:

1. A report is to be made on this form as soon as possible after ever incident or accident and sent to:

2 copies — Officer Commanding
RE Diving Establishment
HMS Vernon
PORTSMOUTH
PO1 3ER

3 copies — MOD (PAT 2)
Room 231
First Avenue House
Holborn
LONDON
WC1V 6HE

1 copy — Command Diving Officer or Chairman of Command
ASDA

1 copy — Unit MO

2 copies — to be retained.

2. In serious cases involving hospitalization or a fatality, a report is to be made as soon as possible by telephone or signal to:

Officer Commanding
RE Diving Establishment
HMS Vernon

Telephone: Portsmouth Naval Base Ext 24604
 Portsmouth Civil 822357

Signal: SCHODIVING using SIC LOB

All signals are to be copied to MOD UK Army for PAT 2 SIC B4G. MOD PAT 2 will inform ASDA.

INCIDENT/ACCIDENT REPORT

Club

Exercise

Name

Rank

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Service No

Date of Incident

SubAqua Diving Qualification

SUMMARY OF INCIDENT

1.

PREVALENT CONDITIONS RELATED TO INCIDENT

2. Time.

3. Place.

4. Grid Reference.

5. Wind Direction.

6. Wind Force.

7. Tidal stream or current:

a. Direction

b. Rate

8. State of weather and sea.

9. Surface Visibility Miles.

10. Depth in Metres:

a. Charted

b. Actual

11. Conditions underwater (eg nature of bottom, visibility etc).

12. Temperature.

DIVER'S BACKGROUND

13. Age.

14. Previous diving experience.

15. Previous incidents.

16. Medical history in past month.

17. Details of dives during the 24 hours before this incident.

DIVE 1 DIVE 2 DIVE 3 DIVE 4

a. Time

b. Date

c. Depth

d. Duration

e. Equipment

f. Decompression

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18. Most recent food intake:
 - a. Nature
 - b. Time
 - c. Eating habits
19. Most recent alcohol intake:
 - a. Nature
 - b. Time
 - c. Drinking habits
20. Pre-dive drill:
 - a. Main cylinders opened
 - b. Buoyancy test
 - c. Entered water
 - d. Method of entry
 - e. Task

INCIDENT HISTORY

21. Appearance of diver when first seen.
22. Time.
23. Account of events underwater.
24. Method of surfacing.
25. Condition of diver at the surface.
26. Diver Leader:
 - a. Name
 - b. Rank
 - c. Diving Qualifications
27. Others on Dive. (Name, rank and qualifications to be given in each case).
28. Action taken after diver surfaced.
29. Remarks.
30. Transcription of stop times.

DIVE PLAN

31. Details.

EQUIPMENT REPORT

32. Type of equipment:
 - a. Demand valve.
 - b. Cylinders.

- c. Harness.
- d. Weights.
- e. Weight belt.
- f. Life-jacket.
- g. Protective clothing.
- h. Knife.
- i. Mask.
- j. Fins.
- k. Snorkel.

33. State of equipment before dive:

- a. Cylinders charged (date and time).
 - (1) Pressure.
 - (2) Last Test Date.
- b. Total weights used.

34. State of equipment after dive:

- a. Pressure.
- b. Number of turns to close each cylinder valve.
- c. Weight of belts.
- d. Buckles (weight belt and cylinder harness).
- e. Demand valve.
- f. Life-jacket.

35. Witness/es report/s are attached as detailed below (delete as necessary).

Name and Rank.

Signature

Rank

(Name in Block Capitals)

Diving qualifications

Date

APPENDIX 6 TO ANNEX T TO CHAPTER 11
BSAC DIVER GRADES, JOINT SERVICE COURSES AND
THE NORMAL COMPOSITION OF CLUB COMMITTEES
 (Para 32 refers)

BSAC Diver Grades

1. BSAC Diver and Instructor Grades are shown in the tables below:

Serial	Diver Grades	Authority for Qualification	Courses Available and Approximate Length of Time to Reach Grade	Remarks
(a)	(b)	(c)	(d)	(e)
1	Novice Diver	BSAC Club (Unit or Garrison)	Unit or command courses linked to BSAC club. 5 day course or about 3 months in a club.	BSAC qualifications up to Advanced Diver are awarded by BSAC clubs although courses may be used to shorten training.
2	Sports Diver	BSAC Club Club	Unit or command courses. The UKLF School of P&RT run 12 day courses for divers of Novice Grade. Normal club training would take about 3 months.	Before a person is awarded this grade he should have had enough experience to be safe, sensible and reliable diver in normal circumstances.

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(a)	(b)	(c)	(d)	(e)
3	Dive Leader	BSAC Club	Unit or command courses of approximate 5 days duration. Normal club training would take about 3 months.	This grade is the lowest that can take into open water a Novice Diver Grade. Before a person is awarded this grade he must demonstrate that he is a competent and safe diver.
4	Advanced Diver	BSAC Club	UKLF School of P&RT run courses at this grade as do some overseas centres. Most obtain this grade in their clubs. A diver of Dive Leader grade would take a minimum of 6 months to achieve this grade.	This grade requires experience as well as knowledge as a club's standard and safety depends on divers of this grade. It would be unusual for a person to reach this grade with the necessary experience in under 18 months.
5	First Class Diver	BSAC National Award	BSAC run an annual examination which runs over one weekend after the candidate has successfully completed a 3 hour written examination earlier in the same year.	This is the highest divers award available and divers do not have to go through the instructor grades to obtain it. It does require a wide knowledge of diving theory and considerable experience.

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BSAC Instructor Grades

2. BSAC Instructor Grades are shown in the tables below:

(a)	(b)	(c)	(d)	(e)
6	Club Instructor	BSAC National Award	BSAC run weekend training course which is a pre-requisite to taking the exam. The exam is a one day exam covering theory, lecturing and instruction.	All clubs should aim to have their instructors up to this minimum grade.
7	Advanced Instructor	BSAC National Award	BSAC run weekend examinations throughout the UK. Candidates are required to be Club Instructors and BSAC Advanced Divers. A weekend optional course is available. The theory examination has to be passed prior to attempting the practical open water examination.	Club diving officers should aim to be of this grade.
8	BSAC National Instructor	BSAC National Award	BSAC runs an annual examination which runs over 2 weekends after the candidate has successfully completed a 4 hour written paper.	This is the highest national award and is reached by very few divers.

Notes:

1. BSAC grades (divers and instructors) have international recognition by the CMAS, the world Under Federation.
2. BSAC Instructor and other courses at national level are run by the BSAC for overseas subaqua divers in Hong Kong, Cyprus, Gibraltar and Germany on an annual or 2 yearly basis. For details contact the command ASADA representative.

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Joint Service Subaqua Qualifications and Courses

3. There are no Joint Service or Army subaqua diving standards as such. In the Army it is considered that the BSAC qualifications are the best and most appropriate for Service personnel who wish to take up the sport and who may well wish to continue diving once they have left the Service. Their BSAC qualifications and diving experience will be recognised throughout UK and internationally.
4. The Joint Service Centre at Fort Bovisand does however run the following courses for subaqua divers.
 - a. *Joint Service Subaqua Diving Supervisors (SADS) Assessment Course.* The qualifications obtained on this course is a mandatory requirement for at least one diver in each Service club, or on a Service expedition. See paras 8 and 9 of Annex T.
 - b. *Beginners Course.* This is a 5 day introduction to diving to allow those who have an interest to be introduced to diving including snorkelling and open water dives. Divers are expected to continue their training in their unit clubs, if they wish to continue diving.
 - c. *Intermediate Course.* This is a follow on course for divers of approximately BSAC Sports Divers class standard to give them a week's concentrated diving and diving theory. No qualifications are awarded on either the Beginners or the Intermediate Course but a certificate of training is given to the diver and this may be accepted by his unit or garrison club.
 - d. *Advanced Course.* This is for BSAC Advanced Divers who wish to progress to Advanced Instructor or 1st Class diver standards.
5. Details of courses run at the Joint Service Centre are in DCIs. The courses are very good value. All BSAC Advanced Divers should aim to go on a Supervisor's course.

Composition of Club Committees

6. In order that a subaqua club functions properly i.e., diving is conducted safely, equipment is maintained properly and the members get the maximum value from the activity, it is necessary to have a properly constituted committee. In BSAC civilian clubs whose membership is generally on a long term basis and key members move infrequently, the committee is elected annually at an AGM. In most Army clubs this is not a practicable system and as a general rule committee members should be chosen from those who are willing and capable of doing the job. Chairmen are recommended to obtain a copy of the ASADA constitution for additional information. Copies are available from command subaqua associations.
7. The normal committee posts together with notes on them are shown below:
 - a. *Chairman.* Preferably an officer diver chosen by the CO or relevant authority for garrison clubs. If there are no officer divers this appointment is to be filled, if possible, by an officer not below the rank of captain.

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- b. *The Diving Officer.* This is the key diving post and it would normally be filled by the most qualified diver irrespective of rank since he is responsible in any case to the club committee. A diving supervisor or a qualified BSAC instructor would be a natural appointment for the post provided he is willing to take on the job.
 - c. *The Secretary.* This post is best filled by someone who has access to clerical facilities and it could be an officer, WO or sgt, or even a cpl clerk in a small club. The person does not have to be a diver but it helps.
 - d. *The Treasurer.* This job can be combined with that of Secretary in small clubs provided the person has the rank to deal with financial matters. It is not necessary for him to be a diver.
 - e. *The Equipment Officer.* This is best filled by the most qualified diver who has an interest in this field.
8. Additional posts for larger clubs are shown below:
- a. *Training Officer.* He assists in the training club members under the direction of the diving officer. The latter may decide to concern himself with all diving matters and nominate the training officer to look after all pool matters. The diving officer should select the training officer himself. The training officer should preferably be qualified to BSAC Advanced Diver but at least BSAC Dive Leader standard.
 - b. *Assistant Equipment Officer.* If there is a lot of equipment including boats and compressors the equipment officer will need an assistant. He should select him from among reliable divers.
 - c. *Records Officer.* The maintenance of diving records of a large club need considerable attention and a specially appointed record officer is desirable for this purpose. In a small club the secretary would normally undertake the task.
 - d. *Expeditions Officer.* If the club is to run regular weekend expeditions or a large annual expedition, an officer or senior NCO should normally be appointed as expeditions officer.
 - e. *Publicity Officer.* Whilst not essential, the appointment of a suitable person will help publicise club activities, promote good relations with other clubs and local interest and help recruit new members, particularly in garrison areas.

Summary

- 9. It takes some time to train divers because diving is a potentially hazardous activity and the dangers in it are nearly all hidden, unlike rock climbing or free-fall parachuting, where they are obvious.
- 10. Experience is necessary in addition to knowledge for those in responsible posts; some experience can be gained from courses but a lot has to be gained by diving in different localities under varying circumstances.
- 11. A diver who has recently learnt the subject is not automatically able to instruct. To become a weapon training instructor or a gliding instructor for example you have to

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be taught how to instruct as well as having knowledge and experience of the subject. The same applies even more to diving because the sea is always a potential hazard and accidents when they occur happen very quickly. Good diver training linked to a knowledge of the hazards that are liable to occur in open water diving is the best way to enjoy diving and avoid accidents.

12. Further advice on these matters is available from:

- a. The ASADA Command Representative.
- b. The ASADA Executive Committee.
- c. The British SubAqua Club.

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28. **In Date Service qualified divers.** In Date Service qualified divers organizing adventurous training exercises using Service diving equipment must elect to dive under the provisions of Joint Servicing Diving Manual (BR 2806) or this instruction.

Organization of the ASADA

29. The ASADA operates through an executive committee and command associations, copies of the ASADA constitution are available from the Executive Committee.

30. The ASADA Committee consists of:

The President
The vice presidents (Up to 4)

The Executive Committee

Chairman
Vice Chairman
Secretary
Service Diving Advisor — OC RE Diving Establishment
MOD (PAT 2)
UKLF Chairman
UKLF Diving Officer
BAOR Association Representative

The General Committee

The President
The Vice President
The Executive Committee
Representatives of the Command SubAqua Association of:

UKLF
BAOR
Gibraltar
Cyprus
Hong Kong

31. **Terms of reference.** The association's terms of reference are:

- a. To encourage subaqua diving throughout the Army.
- b. To advise the MOD (PAT) and commands on all subaqua diving matters, particularly on safety.
- c. To exercise control of subaqua diving in the Army through command subaqua associations.
- d. To liaise with the Joint Service SubAqua Diving Committee, the subaqua diving associations of the RN and RAF, and the British Subaqua Club, the civilian national body.

32. Formation of unit or garrison subaqua clubs. Units or garrisons intending to form subaqua clubs are to contact their local command subaqua association for advice on the best way to form and run their club in the command. The composition of a club committee and the BSAC standards for divers, together with some information on courses available for divers are summarized in Appendix 6 to this Annex. The minimum standard for a club diving officer is BSAC Advanced Diver and the theoretical syllabus for this standard is given in Appendix 1.

33. Registration of unit subaqua clubs and individual divers. In order that the command subaqua association has a knowledge of clubs and individual divers in the command, so information and advice can be passed on to them, subaqua clubs are required to register with their command subaqua association. Qualified subaqua diving supervisors and local subaqua diving supervisors will retain their qualifications while they remain active responsible divers and registered annually with ASADA.

34. Withdrawal of subaqua diving supervisor qualification. Command subaqua associations are however authorized to withdraw any subaqua supervisor qualification if there are good reasons for doing so, but in all cases the withdrawal is to be reported with the relevant details to the Chairman ASADA as soon as possible and not later than a month after the suspension. The subaqua diving supervisor has a direct right of appeal to the ASADA Executive Committee. The final decision on the status of the supervisor is to be made by the executive committee.

35. Army Sport Control Board (ASCB). The ASADA is an Army Sports Association recognized by the Army Sport Control Board.

36. Enquiries. Enquiries should be addressed to command representatives or the Secretary ASADA. Names and addresses of command representatives should be given in command orders and the name and address of the Secretary ASADA and other members of the Committee may be obtained from MOD (PAT).

37. Insurance. See Annex J to this Chapter.

38. Appendices. This annex includes the following appendices:

Appx	Subject	Para Refs
1.	Theoretical Examination Syllabus for Divers	9c(1), 32.
2.	Medical Certificate and Standards	9d, 18.
3.	Services' Diving Log (Format)	11d.
4.	Decompression Tables	11e(1), 16i.
5.	Diving Incident or Accident Report	11e(9), 19-22.
6.	Divers' Grades and Courses and Composition of Club Committees	32.

Additional Pay – Divers

[EinC(A)/160/Engr 6J]

72.071. This instruction covers the qualifications, standards of diving practice and the payment of Additional Pay - Divers (AP-D) to Army divers. (The instruction does not cover sub aqua divers who do not qualify for AP-D).

72.072. The authority for the payment of AP-D is contained in the Army Pay Warrant as follows:-

Officers	Sec 230
Warrant officers, non commissioned officers and privates	Sec 483
Brigade of Gurkhas	Sec 552

Qualification

Qualification
72.073. Additional Pay-- Divers (AF-D) is payable continuously to personnel who have qualified in diving duties as shown below at, or under instruction from, the Royal Engineers Diving Establishment (REDE), and are engaged in diving, either operationally or for practice.

Grade	Category	ADP Code
Army Compressed Air Diver (ACAD)	1	183
Unit Diving Supervisor (UDS)	1	E.69
Army Advanced Diver (AAD)	2	246
Army Diving Supervisor (ADS)	3	196
Army Diving Instructor (ADI)	3	C.60

72.074. The detail of training and eligibility to qualify personnel for Army diving grades, save for ADI, is listed in Courses of Instruction Pamphlet No. 8A. An ADI is an ADS qualified NCO who is filling a diving instructor appointment at a Service diving school.

Required Standard of Diving Practice

72.075. The required standard of diving practice for Army divers serving in unit diving teams or filling established diving posts is laid down by the Superintendent of Diving - Army (SODA) in accordance with operational needs and is published separately. It will always be more demanding than the minimum standard of practice laid down in para 72.077.

72.076. Army divers not serving in a unit diving team nor filling established diving posts

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are, nevertheless, under a continuous liability to dive and are required to achieve the minimum standard of diving practice.

Minimum Standard of Diving Practice

72.077. The minimum standard of diving practice for the continuous payment of AP-D is as follows:

- a. 90 minutes underwater in each 3 month accounting period. (Exceptionally SODA may authorize 120 minutes underwater in a 6 months accounting period if personnel have been prevented from diving for over 3 months in the period due to operations, overseas training or for other military reasons.) Diving is to take place on at least 2 separate days and is to conform to para 72.078.
- b. A 2 day Annual Personal Assessment (APA), to be taken once every training year (1 April to 31 March) and to be carried out as laid down by SODA and under the supervision of REDE or REDW (Iiel). Attendance on a diving training course at REDE will count as the APA for the year in which the course is held.

Conditions of Diving Practice

72.078. The following conditions apply to both the required and the minimum standard of diving practice:

- a. Half of the qualifying times are to be in water with limited to nil visibility.
- b. Each diver is to be given a specific task to undertake as part of the diving practice.
- c. Diving time, whilst qualifying on a diving course, may be counted as qualifying time for the accounting period.
- d. Authorized adventurous training using Service diving equipment, and sport diving authorized in advance by the unit diving officer or SODA, may be counted up to a maximum of 50 per cent of the qualifying times.
- e. All dives must be recorded in the Diver's Log (AB 576), with each entry certified by a Service diving supervisor authorized to supervise Army diving (BR 2806 Sec 2011). For adventurous training and sport diving only, the Service diving supervisor is to countersign the Sub Aqua Diving Supervisor's entry after satisfying himself after reasonable inquiry that the dive details are correct.

Payment of AP-D

72.079. The payment of AP-D to Army divers, not serving in established or annotated diving posts, is controlled by SODA on behalf of MOD (AG Sec2). Units with such divers on strength are to apply to SODA for written authority for them to be paid AP-D. The number of officers and soldiers receiving AP-D under these circumstances should at no time exceed 25 per cent of the total number of established and annotated diving posts. AP-

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Para 72.081

D is only authorized when, after consultation with the diver's personnel branch or manning and records office:

- a. There is every likelihood that the diver will return to an established or annotated diving post within 3 years of leaving such an appointment.
- b. It is in the interests of the Army that the diver continues to remain in practice.

72.080. An Army diver ceases to be entitled to AP-D as shown below. Both the diver concerned and his unit have a responsibility to ensure that cessation of AP-D is carried out promptly by Part 2 Order action. Copies of all Part 2 Orders affecting AP-D are to be sent to SODA.

- a. On posting. (The unit to which a diver is posted is to check with SODA before initiating AP-D, if the diver is not going to fill an established or annotated diving post in his new unit.)
- b. Failing to fulfil the minimum standard of diving practice in a quarterly period the effective date of relinquishment being the last day of the last quarter in which he qualified, unless exceptionally authorized in advance by SODA under para 72.077a.
- c. Failing to take the APA in the training year or failing the APA and failing to requalify within 30 days of that failure, the effect date of relinquishment being the date of the original APA failure even when it falls in a period previously qualified under paragraph 72.077a.
- d. When medically unfit to carry out diving duties for reasons beyond his own control after a period of 91 days from the date on which he first reported sick.
- e. An ADS who becomes permanently medically unfit may retain his supervisory status at the discretion of his commanding officer as advised by SODA. The supervisory status is to be reviewed annually by SODA who is to give his recommendations to the ADS's commanding officer. An ADS (NQD) does not qualify for AP-D.
- f. On reassessment or withdrawal of diving qualifications by SODA.
- g. Voluntarily relinquishing his diving qualifications.
- h. During the investigation of a diving related incident as advised by SODA.
- i. Disciplinary action concerned with, or affecting, the issue of AP-D.

72.081. The unit diving officer, or unit records officer of a unit having a diver on strength is to check the Army Diver's Monthly Record Form AF B 6850 and complete and submit the Army Quarterly Diving Return - AF G 8265 to SODA within 10 days of the

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accounting periods ending on 31 Mar, 30 Jun, 30 Sep and 31 Dec. Additional distribution is to be laid down by command headquarters. SODA is to compare the unit returns against the ADP rolls and his own records and is to inform regimental paymasters and OCs units of any discrepancies or action necessary due to the ineligibility of individual divers to receive AP-D.

Lapse of Diving Qualifications

72.082. If an Army diver fails to carry out any diving for 6 months, or fails to complete satisfactorily his annual personal assessment, he will be required to requalify in diving duties by practical and written testing under arrangements made by REDE or REDW Kiel.

72.083. If an Army diver fails to carry out any diving for 2 years, his diving qualification will lapse and he will require retraining if he wishes to become a diver again.

72.084. An Army diver not in receipt of AP-D may retain his qualification by diving once in every 6 months for a period of at least 30 minutes. These dives must be carried out in Service diving equipment under Service diving rules and supervision.

BR 2806 Diving Manual: Army Code No 61231

72.085. This instruction is to be read in conjunction with BR 2806 Diving Manual: Army Code No 61231, which contains the diving regulations and additional detail on diving control and administration.

72.086 - 72.090. Reserved.

